leum refining. Emissions from a plant's smokestack, which result from heating the asphalt during the mixing process, are tightly regulated under the Clean Air Act. The Todesca plant would have produced as much as 360,000 tons of asphalt per year and, the company estimates, 12.2 tons of stack emissions. "It's a very, very minor air polluter in the scheme of things," says Ralph R. Willmer of McGregor & Shea, Todesca's law firm.

The plant's opponents concede that point, but they maintain that the plant's fugitive emissions—everything that *doesn't* go through the smokestack—would have dwarfed its stack emissions. Hot asphalt is generally dropped into a truck from a height of 10 to 15 feet. This sends up a cloud of particulate matter and volatile organic compounds (VOCs), which aggravate respiratory problems, and polycyclic aromatic hydrocarbons (PAHs), which can cause cancer. More asphalt fume is released into the air as the truck is weighed and heads out to the job site.

Ravindra M. Nadkarni, a retired chemical and metallurgical engineer who helped defeat another asphalt plant, in Wrentham, Massachusetts, calculated that the Todesca plant would have produced more than 300 tons of fugitive emissions per year. He says, "Todesca's whole approach was to say, 'We're doing what the EPA requires.' And that is correct." But Nadkarni believes that the EPA should set standards for *all* asphalt emissions, not just for those that come out of a smokestack.

Now the EPA seems to be moving in that direction. This summer Ron Myers, a senior environmental engineer with the agency, began working with the National Asphalt Pavement Association, an industry group, to design a test that will quantify the amount of fugitives being emitted. Says Myers, "We don't have enough money to *analyze* fugitive emissions," which would be a prelude to setting standards. "But," he continues, "at least we'll be able to tell people what the emissions will be from a typical well-controlled plant.... Now that we have good control of smokestacks, fugitives are a bigger proportion of emissions."

Whatever the source, asphalt fume is thought to pose a variety of threats to human health. The EPA's emissions manual lists a number of components of the

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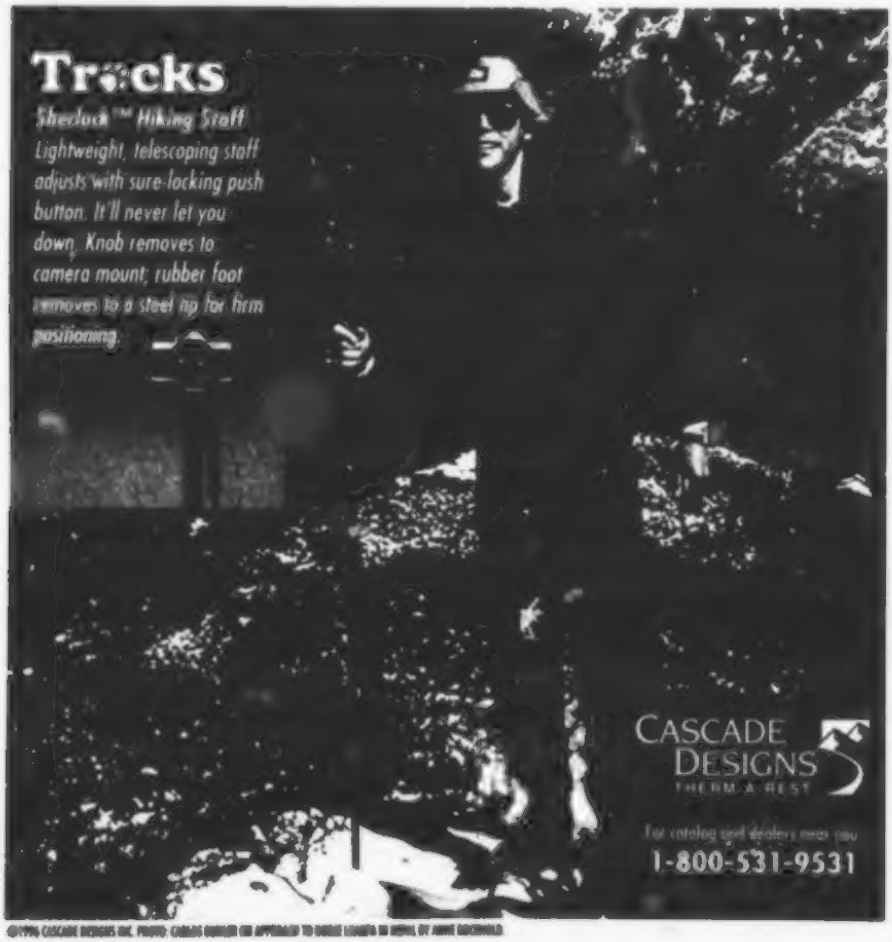
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substance, including sulfur dioxide, carbon monoxide, and nitrogen oxides (all of which cause respiratory problems); benzene (a known carcinogen); toluene (a reproductive hazard); and heavy metals such as hexavalent chromium (a carcinogen) and lead (which can cause learning disabilities and behavioral problems in children). Myers says that the negative health effects may be avoided by completely enclosing a plant, for instance, or using sophisticated filters to capture fugitive emissions.

In Boston, however, the board of health decided that the proposed asphalt plant should not be allowed to go ahead. On May 1 it issued a unanimous resolution prohibiting the building of an asphalt plant on the site Todesca owns, finding that "operation of the facility may . . . be dangerous to the public health," that "the existing health of the surrounding communities has been compromised with high levels of respiratory ailments, asthma, and other illnesses," and that "fugitive emissions from the proposed plant are likely to increase lung and other cancer rates."

Nadkarni, whose emissions calculations weighed heavily in the board's decision, readily admits that prohibition is not the solution in all cases: "I'm not a crusader that says we've got to shut down all asphalt plants. But we do need to reduce the emissions, because there's no ready substitute for asphalt."

—Mary-Powel Thomas

ENVIROTECH

Rating the Chemical Companies

EXXON REFUSED to participate, and French chemical giant Rhône-Poulenc threatened dire consequences if anything damaging was said about it. But in the end the second German Top50 study, which compares the environmental performance of major chemical producers worldwide, was released in May. As intended, it provided a revealing scorecard against which companies could be measured in terms of their environmental consciousness.

The chemical industry has long been rated one of the chief threats to wildlife

and habitat, not to mention human health. But results of this year's Top50 report show some well-known U.S. companies making real progress in their efforts to change.

Fifty companies were grouped into four categories: proactive, active, reactive, or passive. In the top category, Johnson & Johnson finished first and 3M was third. Dow Chemical, Unilever, Bristol-Myers Squibb, and DuPont also ranked as proactive. Companies that placed in the worst, or passive, grouping included Merck, Amoco, Colgate-Palmolive, Occidental Chemical, and GE Plastics BV. But even in the best cases there's room for improvement. As Isabel Urben, the study's project manager, points out, Johnson & Johnson won with 296 of a possible 500 points.

The study was conducted by the Hamburger Umweltinstitut (Hamburg Environmental Institute), which is led by noted chemist Michael Braungart. The process began with detailed questionnaires' being sent to 67 top chemical producers. (Seventeen did not respond or responded incompletely.) The forms contained such questions as "Does my company ensure that key environmental information is available to all departments (e.g., R&D, Finance, Marketing, etc.)" and "Do we systematically gather information on chemical pathways of our products and their ingredients?" The completed forms were compared with independent data on the companies from such sources as the Council on Economic Priorities. The results were then reviewed by a panel of scientists.

All this work took nearly two years to complete, but the results both encourage competition among the companies and provide the best available means of scoring their efforts. Even Rhône-Poulenc has now come around, offering to sit in on an institute conference set for this fall. Perhaps company officials read the recent news that Dow Chemical plans to invest $1 billion over the next 10 years in new environmental initiatives—and expects to reap a return of 30 to 40 percent. Or they could have talked with someone at Bristol-Myers Squibb, which has saved an average of $300,000 on every product it has subjected to life-cycle analysis. Figures like those are hard to argue with. Still, there's been no word from Exxon. —*Robert Frenay*

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Compromising Wilderness

By Ted Williams

In northern Minnesota, will the motorboats' roar be the new call of the wild?

SUCCESS and the balsam-scented breeze in my face felt wonderful. The portage between Moose and Wind lakes had probably been less than a mile, but on this the first hot day of 1996, it had seemed like two. The canoe was an 18-footer, and I had doubted my ability to carry it all the way without a rest. My fused spine was sore, and what I hoped was a temporary inner-ear problem had made me stumble drunkenly along the rocky trail. Before too long I would qualify as at least "elderly" and possibly "disabled." Then, according to Wise Use dogma, I would be "discriminated" against by the wilderness status of northern Minnesota's Boundary Waters Canoe Area.

I have it from the Conservationists With Common Sense, a Wise Use group based near the wilderness-gateway community of Ely, Minnesota, that in my decrepitude I will no longer seek wilderness on its own terms. Instead, I will demand and deserve handouts and technological fixes—outboard motors, roads, and "motorized portages" on which I can pay a truck driver to haul my boat for me. I will rue the banning of floatplanes and off-road vehicles from this 1.1 million–acre collage of dark forests and shining, river-connected lakes, which—along with the rest of the Superior National Forest and Canada's adjacent 1.2 million–acre Quetico Provincial Park—is the heart and lungs of an ecosystem bigger than Yellowstone National Park.

But as I stood on the beach at Wind Lake, I was not thinking about my future. I was not even thinking about the future of the National Wilderness Preservation System, which, depending on the parcel, is administered by the U.S. Forest Service, the National Park Service, the U.S. Fish and Wildlife Service, or the Bureau of Land Management, and which is threatened now as never before. Instead I was admiring the two dozen tiger swallowtail butterflies ingesting minerals from the wet sand, and I was trying to spot the raven croaking from the high shore. From newly leafed birches and aspens a ruffed grouse drummed. Hermit thrushes caroled all around me, and 50 yards straight out a pair of loons bobbed low in the sparkling waves. In the cool, limpid water, smallmouth bass and goggle-eyes cruised over ancient Canadian-shield granite.

Presently I was joined by gear-laden Kevin Proescholdt, executive director of the conservation group Friends of

the Boundary Waters Wilderness. As we ghosted in the canoe over the utterly undamaged routes of the Chippewa, the Sioux, and the French voyageurs, I recalled the words of Proescholdt's late friend Sigurd Olson—writer, naturalist, and hero of this wilderness: "The movement of a canoe is like a reed in the wind. Silence is part of it, and the sounds of lapping water, bird songs, and wind in the trees. It is part of the medium through which it floats, the sky, the water, the shores.... The way of a canoe is the way of the wilderness and of a freedom almost forgotten."

A canoe in the Boundary Waters wilderness. Top: Congressman Bruce Vento protests a proposal to open the area to motorboats.

Like so many Americans, Proescholdt and I yearn for and pursue the sounds, scents, and visions that moved and motivated Olson. When we do our thing in wild country, operators of internal combustion engines everywhere are utterly unaffected—ignorant, in fact. Yet for them to do their thing frequently means that we must cease doing ours. "Mechanized recreation already has seized nine-tenths of the woods and mountains," another hero of wilderness, Aldo Leopold, once wrote. "A decent respect for minorities should dedicate the other tenth to wilderness."

I had returned to northern Minnesota to soak in wilderness, to remind myself why I write for *Audubon*, to retrace the steps and strokes of Sigurd Olson, to hang out with wilderness activists who need silent, untrammeled places as much as I do, to study the people who are using the Boundary Waters in an effort to dismantle all wilderness.

Designated in 1926, the Boundary Waters Canoe Area is the United States' most heavily used wilderness, and its second oldest. Minnesotans have 14,000 lakes (including the biggest one in the world) in which they can run their motorboats, but Americans have only one major lakeland wilderness they can navigate by canoe. Despite all the water in Minnesota, motorboats are currently allowed on 22 of the larger Boundary Waters lakes, which together compose about 21 percent of the wilderness's surface water. This is an anomaly for a designated wilderness; it was written into the Wilderness Act of 1964 and is part of the history of compromise that has both permitted and plagued the Boundary Waters.

American democracy is built on compromise, but after all the compromise needed to designate a wilderness, there's a limit to how much more it can stand before it turns into something different, something less. The most recent attempts at compromise were introduced in the U.S. House of Representatives on April 23 by Representative James Oberstar (D-MN) and in the Senate on May 8 by Senator Rod Grams (R-MN). The bills would increase the amount of surface water open to motorboats in the Boundary Waters to 31 percent, reopen three commercial motorized portages closed by court order in 1992, do away with various quotas limiting overcrowding, and—in a provision that wilderness defenders see as the real purpose and danger of the legislation—set a national precedent by wresting regulatory authority from the Forest Service and turning it over to a "management council" dominated by local politicians and county commissioners.

But Oberstar and his followers scarcely mention the management councils. Instead, they talk incessantly about a very sore boil on Ely's backside—the closed motorized portages. Oberstar claims that the closures, forced by Friends of the Boundary Waters Wilderness, are "devastating" the local economy and have "virtually eliminated wilderness access for the handicapped, elderly, and families with young children." Whether you accept that or not, it's pretty hard to argue with the *Duluth News Tribune* when it editorializes that the Friends' lawsuit "was a tactical and logical mistake" and that "Oberstar rightly seeks to end a situation in which boaters can use motors on either side of a portage but not in crossing it. However, the rest of his bills are an open invitation to renew the acrimony that split the region two decades ago—and to prompt court battles that will serve no one but attorneys."

INCITE

Also harping about the portages—all the way from its base in Idaho—is the Blue Ribbon Coalition, an especially shrill Wise Use umbrella group financed by mining, timber, and off-road-vehicle companies. Last July the cover story of its monthly publication bragged about the crusade of its Minnesota member, the Conservationists With Common Sense (CWCS), for "joint control of federal lands," tub-thumped for Oberstar's bill, railed against "Big Green and their media lackeys," and concluded with: "A beachhead in winning the War on the West has been established in Minnesota."

Actually, intermittent fight-

LEFT: JIM BRANDENBURG/MINDEN PICTURES; TOP: KEVIN HOCKSWENDT

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INCITE

ing has been occurring on this "beachhead" for at least 60 years. In the late 1930s Olson was being turned away at the grocery store and threatened with termination as a biology professor at Ely Junior College because of his work with the pro-wilderness Izaak Walton League of America. By the end of World War II there were dozens of resorts being serviced by air, and Ely had become the continent's biggest inland floatplane base. Frank Hubachek, who had dared to testify that he'd counted 38 planes passing over his Basswood Lake cabin in one day, received death threats; an explosive device was detonated under the porch of outspoken floatplane critic and canoe outfitter Bill Rom. Still, in 1949 Minnesota Senator Hubert H. Humphrey convinced President Truman to ban flights below 4,000 feet.

In 1975 a court order put a stop to logging—another compromise that had been built into the Wilderness Act specifically for the Boundary Waters Canoe Area. The following year the Forest Service banned snowmobiles. Oberstar has been seething ever since. His first bill, introduced on October 20, 1975, sought to compromise about half of the Boundary Waters by opening it to logging and motorized travel. A competing bill, introduced by Representative Donald Fraser (D-MN), would have closed the entire area. During congressional hearings on the Fraser and Oberstar bills, Ely hanged in effigy its most famous resident—Sigurd Olson—and interrupted his testimony with prolonged boos, jeers, and stomping. When the crowd was finally gaveled into relative silence, Olson stood again and managed to deliver these hated words: "This is the most beautiful lake country on the continent. We can afford to cherish and protect it."

The hearings also elicited a series of demonstrations in which logging trucks paraded through Ely and wilderness haters blockaded Boundary Waters entry points. At length the Senate and House worked out a "compromise," and on October 21, 1978, President Jimmy Carter signed the Boundary Waters Canoe Area Wilderness Act. This is the law that, contrary to virtually all legal interpretations of American wilderness, provides limited access to motorboaters.

After an 18-year cease-fire, the fighting flared again on August 18, 1995, at International Falls, when the CWCS and its allies prevailed on Oberstar to hold a hearing on the new legislation he had promised them. Flatbed trucks piled high with snowmobiles and logs surrounded the gathering, and frequent jeering and booing from both sides forced the chairman, antiwilderness guru Representative Jim Hansen (R-UT), to stop the hearing at least a dozen times. State Senator Doug Johnson scared the bejesus out of environmentalists with this glassy-eyed testimony: "Let me just very quickly say, and we do not want to do this, but could you imagine if you could go log the Boundary Waters and the Voyageurs [a 218,000-acre national park just to the west]? Could you imagine if you could go mine the Boundary Waters and the Voyageurs? Could you imagine if you could go build resorts and cabins in the Voyageurs and the Boundary Waters, *the tremendous economic boom?*" If Oberstar's bill is enacted, Senator Johnson will sit on the local "management council."

In May staunch wilderness supporter Representative Bruce Vento (D-MN) launched a counteroffensive by introducing a bill that would add 14,120 acres to the Boundary Waters, designate 78,000 acres of Voyageurs as wilderness, and limit motorboat traffic in both. "We compromised in 1978," he declared. "If they want to reopen that compromise now, let me tell you, it can be changed to *increase* wilderness protection, too! Wilderness forever!"

A gray wolf, in the Boundary Waters wilderness.

JIM BRANDENBURG/MINDEN PICTURES

While the Feds still compromise on wilderness, these days they seem to understand that wilderness is for everyone—but not everyone all at once. As I hiked along Olson's favorite Boundary Waters stream, the Isabella, I was thankful that the Forest Service—not local politicians and county supremacists—had promulgated the access regulations. There were other hikers in the woods, but I didn't see any.

What I did see were legions of newly hatched dragonflies hawking gnats over late-blooming marsh marigolds, and brook trout with orange flanks and ivory-trimmed fins scooting over clean gravel. Everywhere white-throated sparrows were singing, "Sam Peabody, Peabody, Peabody"—or, as they often are said to do in this border country, "Sweet Canada, Canada, Canada." I wondered how many National Audubon Society members had been disappointed by the revelation, soberly delivered by the narrator of the Peterson *Birding by Ear* tape, that "obviously, the bird is saying neither." Again I recalled the words of Sigurd Olson: "There are many types of music, each one different from the rest: . . . the song of a white-throated sparrow, its one clear note so closely associated with trout streams that when-

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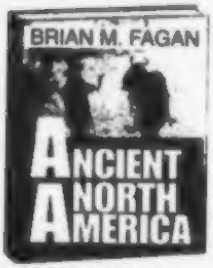

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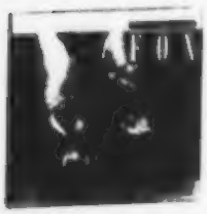
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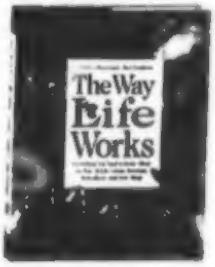

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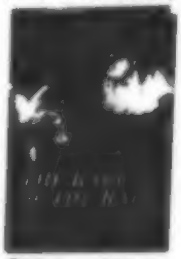
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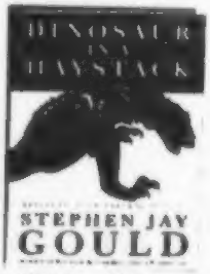

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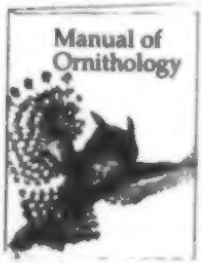

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ever I hear one, I see a sunset-tinted pool and feel the water around my boots."

From the Isabella I made my way to Ravenwood, the 110-acre natural studio of the great wildlife photographer Jim Brandenburg, whose portraits of wild wolves have illustrated some of my articles, including this one. Ravenwood adjoins the Boundary Waters, and it is even wilder because so few people go there. It is "sanctuary," Brandenburg writes in his book *Brother Wolf*. "It represents my cathedral, my dream, my sanity. I come here to work and think, and it is very cherished for all of that, but more so because it is a place where wolves live.... If a country is wild enough for wolves, then it is wild enough for the human spirit."

The wolves, of course, are a product of wilderness, and Brandenburg's financial success is a product of the wolves. In fact, one of them built the cabin, as he likes to say. That's the one whose green eye drills you from behind a tree in one of the most famous wildlife photos ever made. Printed images of these Boundary Waters wolves have inspired our nation, have helped make us love and understand wolves and what they represent.

Wilderness and wolves have brought prosperity to northern Minnesota. So why all the anger?

As Brandenburg and I talked, we watched the progress of the tannin-tinted stream on whose banks these wolves had bickered, played, fed, and slept. It flowed north and west—through the Boundary Waters, through Voyageurs National Park (where Oberstar and Grams are also trying to seize regulatory authority for their antifederal flock), through Ontario, and on into Manitoba to mingle with Lake Winnipeg and, finally, Hudson Bay.

The wolves would ease down from the great boreal forests after Brandenburg had set out road-killed deer (something he no longer does) and shut himself into the cabin for a few weeks, banning visitors and unplugging the phone. He learned that ravens and wolves communicate. When ravens came, wolves would never be far behind. Sometimes the ravens would call in the wolves, and Brandenburg learned to identify that special vocalization. Sometimes when he'd howl at wolves a raven would appear. The ravens benefited the wolves by standing watch; the wolves benefited the ravens by ripping through otherwise impenetrable hide. Such observations about our living earth can be made only in places where it is untrammeled by man. Wilderness, in Leopold's words, is "a laboratory for the study of land-health."

Wolves and wilderness have brought prosperity to northern Minnesota. "So why all the anger?" I asked Brandenburg.

"It's inexplicable," he said. "Very, very strange. We thought we had that battle won. This area has some very vocal, angry, aggressive Wise Use people, and when this new wave of Wise Use Republicans hit Congress, they saw the time was right to pounce. We have politicians who are playing to these loud voices, even though they read the polls."

Typical of the polls is the one conducted by Saint Cloud State University, in Minnesota, which reveals that 49 percent of the people living near the Boundary Waters want current management regulations to remain in force, and another 24 percent want even more wilderness protection. That's 73 percent opposing Oberstar in his own district.

Doubtless it was this majority that convinced Charles Kuralt to proclaim Ely one of the 10 best places he'd discovered during 27 years of *On the Road* reports for CBS News. I wondered what his attitude toward residents might have been if, like me, he had first visited the vice-president and main mouth of the Conservationists With Common Sense—Dea Whitten, who publishes *The Ely Shopper* (a weekly carrying classified ads and occasional Wise Use rantings). In 1993, when the Forest Service announced its new management plan for the Boundary Waters area, the CWCS held a rally at which Whitten brandished an artificial leg at TV cameras, screaming that environmental

extremists were discriminating against the handicapped, and then hurled it to the ground.

I met Whitten on her front porch, which overlooks the moderately developed White Iron Lake. "They could condemn all this for wilderness," she told me with a broad sweep of her arm. Ten years ago she started agitating publicly for more motorized use in the Boundary Waters because, in a sense, she was disabled—pregnant, that is. With her husband and daughter she had attempted a canoe trip into the wilderness. "We had a terrible time," she told me. "And the kid got sick. It was an awful trip. Bob had to carry all the gear because I was carrying a baby in me. It was just *terrible*."

"But shouldn't Americans have one place where they can paddle canoes in silence?" I asked.

"They took almost all of the Boundary Waters and left us a dozen lakes. That's enough; you can't have it all. Kevin [Proescholdt]. You don't need it all, Kevin. We're just a few little people here, and that's why they have always run all over us."

"Who runs over you?"

"Big Green," she exclaimed. "They have an agenda to lock up as much woods and grass and public and private land as they can. They will lie to get their way, like [Congressman] Bruce Vento lies about Oberstar's and Grams's bills."

"But doesn't the Boundary Waters wilderness belong to all Americans? Why should Oberstar and Grams legislate a management council for local control?"

"There has to be someone watching over the Forest Service and saying, 'You can't do whatever the Audubon Society and Friends of the Boundary Waters Wilderness want.' The Greens lie, like they lie about snowmobiles. A lot of people moving into town think snowmobiles desecrate the woods. Look out there on the lake now; you see any tracks?"

This reminded me to inquire if her neighbor Paul Schurke—the noted Arctic explorer who mushed to the North Pole in 1986 and who now guides wilderness dogsledding trips—had been lying when he had reported that she and her fellow CWCS members use their snowmobiles to accost his clients and as platforms from which to shriek at them. At this point Dea Whitten informed me that I was trespassing, accused me of

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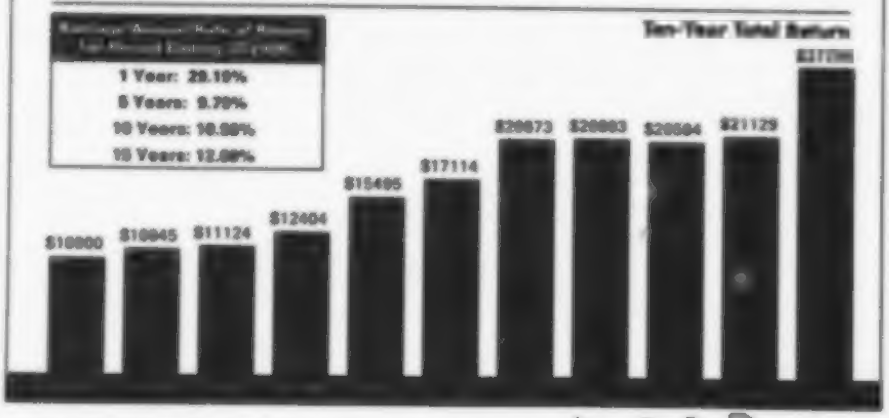

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INCITE

intending to lie like "the press . . . and everybody on the other side," and ordered me off the property. But as I drove away she came running after me. "That Tomahawk Trail is maintained by snowmobilers," she yelled.

Back in Ely, I stopped in to meet Schurke at his store, Wintergreen ("Wintergreed," Whitten had called it). Like Brandenburg, Schurke has found financial success in wilderness, and Ely has benefited. In winter his dogsledding business employs 80 people. His wife, Susan, who manufactures wilderness gear for the store, provides 42 year-round jobs. Schurke passed me a flyer advertising a nonprofit advocacy organization he and his friends have just hatched called Northeastern Minnesotans for Wilderness. The single mission is "status quo for the Boundary Waters Canoe Area"; the CWCS calls the group extremist.

When I visited Ely in 1983 it was depressed, a stagnant puddle along the edge of the wilderness. Now it boomed. New buildings were everywhere. The whole town was packaged, not always distastefully, in the theme of wilderness: Boundary Waters Bank, Voyageurs Video, Paddle Inn, Canoe Tow Services. Wolf tracks painted on the sidewalk led shoppers to store entrances. Bolted to the lampposts along Chapman Street, not 50 feet from the VETO VENTO sticker on the door of *The Ely Shopper*, were metal signs featuring a loon swimming on a lake with an eagle soaring in the background and the sun sinking into a spruce forest.

Wherever I looked I saw stacked canoes and new wilderness-outfitter signs. People from all over the country are flocking to Ely to canoe on wild water, where they can escape internal combustion engines. And yet on May 13, 1996, the Ely Area Development Council voted to support the Oberstar bill publicly as being economically beneficial to Ely. "It's good for business," proclaimed council member Paul Forsman, who forced the vote. "If a person has a problem coming to town because they don't like the Oberstar bill, then they can stay the hell out." As Jim Brandenburg says, it's all "very, very strange."

Having attended Lamaze classes with my wife and twice assisted her in natural childbirth, I think I can at least imagine how difficult it is to be pregnant. But I'll venture that cerebral palsy is harder. Janet Peterson of Saint Paul, who has had the disease since birth, had a dream of canoeing into the Boundary Waters. She had always assumed this was impossible, but then she heard of a group called Wilderness Inquiry, founded in 1977 by Schurke and his college pal Greg Lais, who now serves as director. Today Wilderness Inquiry takes 4,500 people a year into the backcountry; about half have disabilities, many severe. People pay if they can, but at least 50 percent of the operation is financed by donations from foundations, corporations, and individuals. Lais reports that for every disabled person the Wise Use crowd trots out who says, "I can't get access to wilderness," he can produce 25 who say, "That's baloney."

Janet Peterson is one of these. She has so much difficulty speaking that I couldn't interview her. Instead, I asked her to write down the answers to my

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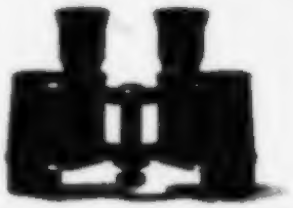
questions about her trips with Wilderness Inquiry and E-mail them to me. Would she like to have Congress arrange for her to be motored into places like the Boundary Waters? I asked. Here's what I found on my computer screen: "I would rather stay home than think I would be contributing to the eventual loss of the wilderness.... I believe in the old adage that we are only visitors to the wilderness and we should adapt to it, rather than the wilderness adapting to us."

Linda Phillips of Minneapolis, deaf and paralyzed from the neck down, also realized her dream of meeting the Boundary Waters wilderness on its own terms. She was one of the most disabled people Wilderness Inquiry had ever served. So fragile was she that Lais and Schurke worried that she wouldn't survive the tip test, in which the canoe is purposely flipped. "She caught wind of our discussion and freaked out," recalls Lais. "She told us we were way out of line, that we had no right to take those decisions away from her. So we flipped her out of the canoe, and she did great. She was so disabled she couldn't even lift her coffee cup to her lips. At the end of the trip, sitting around the campfire at night, she spoke—in a high falsetto voice because of her hearing loss. She said, 'This trip is the most meaningful event of my life.'" A few years later, when Phillips died, Wilderness Inquiry named an award after her.

Sigurd Olson was disabled, too—with Parkinson's disease. He had been suffering from the ailment in 1977, when, at age 78, he faced down the loud, angry crowd to testify for his beloved Boundary Waters Canoe Area. Five years later he wrote these words: "A new adventure is coming up, and I'm sure it will be a good one." Then he rose from his typewriter, lashed on his snowshoes, went out into the woods, and died.

I think Olson saw the "new adventure" as unfolding not just in the Boundary Waters but in schools and town halls and courtrooms across America, on the pages of newspapers and magazines, in the halls of Congress—wherever wilderness compromisers haul out the fiction that easier access means more democracy. And after all the shouting—when we start counting voices again instead of decibels—that adventure just might turn out to be a good one. ■



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A Speck in the Sea

By Frank Graham Jr.

Maine's Flint Island is a place untouched by squalor or glitz.

FLINT ISLAND has remained a bright glow in my consciousness for more than 30 years. If each of us nurtures dreams of a "desert island," a secret place akin to a child's cave or tree house, this island is mine. Its aura is so tinged with fancy that I marvel on a clear day, when from our shore, five miles up the bay, I can see Flint's headland thrust out beyond the intervening islands, a last barrier to an eye searching for the open sea.

Islands, with their real or imagined isolation and mystery, have the power to touch susceptible souls like me, while hardheaded neighbors shake their heads and mutter doubtfully. Yet my desert island is indisputably on the map. Flanked by two narrow bays—Pleasant and Narraguagus—where they mingle with the sea off the coast of eastern Maine, it was acquired as a preserve by the Nature Conservancy in 1968. Its protected status consoles me when I see other natural sites recklessly developed into squalor or glitz.

The feeling of nature tamed and managed never arises here. Flint stands remote in turbulent waters, 10 miles or more from the heart of the town that claims jurisdiction over it, beset by big tides, half-hidden ledges, and dense fogs. A landfall on its exposed rocky rim is not to be carelessly undertaken.

No one knows with certainty how many islands lie along the Maine coast. A speck identified as an island on the chart may be simply a rock awash in plunging fields of snowy surf at high water, while other named islets turn out on inspection to be part of the mainland when the tide falls. But people whose knowledge I respect put the number at about 3,000. Who can resist the lure of one of these outposts in the sea, rugged and forested, with not another human in sight and a lucky visitor hearing only the cry of seabirds over the thundering waves?

On a placid morning I make a run down the bay in my small outboard-powered boat. Black guillemots, those jaunty little relatives of the puffins, submerge at my approach. Marker buoys tip crazily in taut strands of water on the incoming tide. As I skirt a line of foam-washed ledges, the island looms, oddly luminous against the sea.

Closer up, the source of this luminosity is apparent.

A SENSE OF PLACE

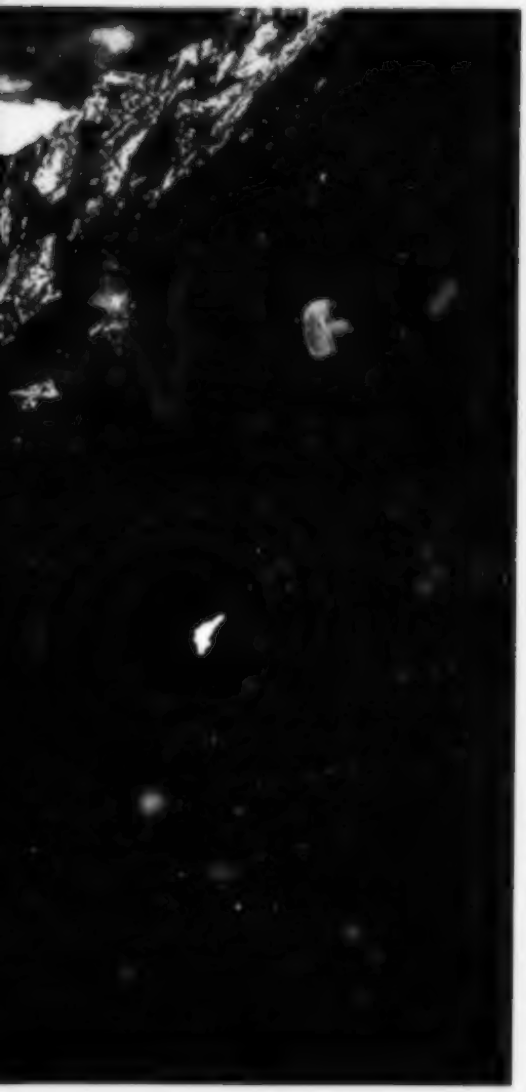
The low, lavender-gray cliffs on the northern shore, formed of fine-grained siltstones, reflect and distort the sun in such a way as to take on a flinty look, which prompted early settlers to give this flintless island its misleading name. It is less than a mile long, but the dense, dark-green spruce forest atop its rocky pedestal suggests a greater expanse.

I sink my anchor into a cobble beach that describes a long arc at a point where the island flings an arm westward into the sea. Smooth, sausage-shaped stones about two inches long and laminated over time by the surf, these cobbles roll under me at each step. All about me on the beach I sense the sea's powerful presence—in a strand of dried rockweed, in the vibrations that linger in the air after millennia of waves crashing on rock, in a gray feather that clings to a stub of dead spruce.

The island has a human history too. Offshore float metal pens draped with netting, where an aquaculture firm began raising Atlantic salmon in 1995. On the westernmost bluff is an old field where people once brought their sheep for the abundant forage. The field has reverted now to wildness, strewn with droppings of the white-tailed deer that swim regularly among the islands.

The shore here displays an array of form and color. Beach peas and harebells share the ground with an occasional gray-green rosette of seaside mertensia, from which peer delicate pale-blue blossoms. Patches of golden lichens ornament rocks shattered by the elements into blocklike shapes that might have taught Cubist painters their art. Fresh water glistens on the rocks.

There are deep fractures in the cliffs along the western shore, bringing to light another sign of human influence on the island. Into those fractures winter storm surges carry their cargo of plastic debris—oil containers, coffee cups, fast-food wrappers, and other items jettisoned by passing fishing boats—and hurl it well up into the forest. I am reminded again of lines from an old hymn, "Though every prospect pleases, and only man is vile." But when I reach the southern cliffs and confront the open sea, I have my redress. There below me, riding a gentle swell, are two male harlequin ducks.



A stern and rock-bound shore: Flint Island, a true refuge off the Maine coast.

The rubble on the south-facing cliffs is a product not of man's grimy fingers but of the glaciers that moved over this shore thousands of years ago. They gouged boulders from the bedrock, tumbling them into a series of giant steps from clifftops to the sea. Behind the boulders at one place the storm waves have carved the cliff facade into a series of crenellations and chunky steeples, the sea's attempt at depicting a medieval city in bas-relief. From the forest above drift the reedy notes of a Swainson's thrush.

Deep gorges in the rocks along this stretch of shore sometimes force me into the trees, where spruce stubs are draped with clumps of old-man's beard lichen, a boreal counterpart to Dixie's Spanish moss. Almost at my feet a ruffed grouse explodes into whirring flight. Deeper in the forest there is an incredible burst of song from a winter wren, full of stutters, trills, and glissandos.

I follow a deer path back to the shore and another cobble beach. At every step large, black wolf spiders flash into sight from under the stones and as suddenly disappear into crannies a few inches away. Turning north, past the offshore ledges that are a favorite hauling-out point for harbor seals, I step up my pace. Lunch lies in my backpack under a spruce bough near the old field.

I have splendid views now across the island toward the fishing towns at the head of the two bays. But the rocks here are dipped in another kind of history, geologists having detected on the island's northeast corner evidence of a volcano that flared up in Paleozoic times.

An hour later I sit on the rocks that rim the old field, eating and staring out over acres of rockweed and tidal pools uncovered by the receding tide. Two mature bald eagles have taken time out too, and perch in high spruces on their small nesting island (another Nature Conservancy preserve) across the channel.

Why does Flint Island possess me? To probe the nature of its spell might be to shatter it, and in any case it may mean nothing to those who don't have in their heads a desert island of their own. But I can mix observation and fancy here, in Blake's phrase, "to see a world in a grain of sand." Like a great poem or a snatch of birdsong, the island resonates in my imagination long after I have retreated into that other world up the bay. ■

CHRIS ANDERSON/AURORA; MAP BY BETH HALL

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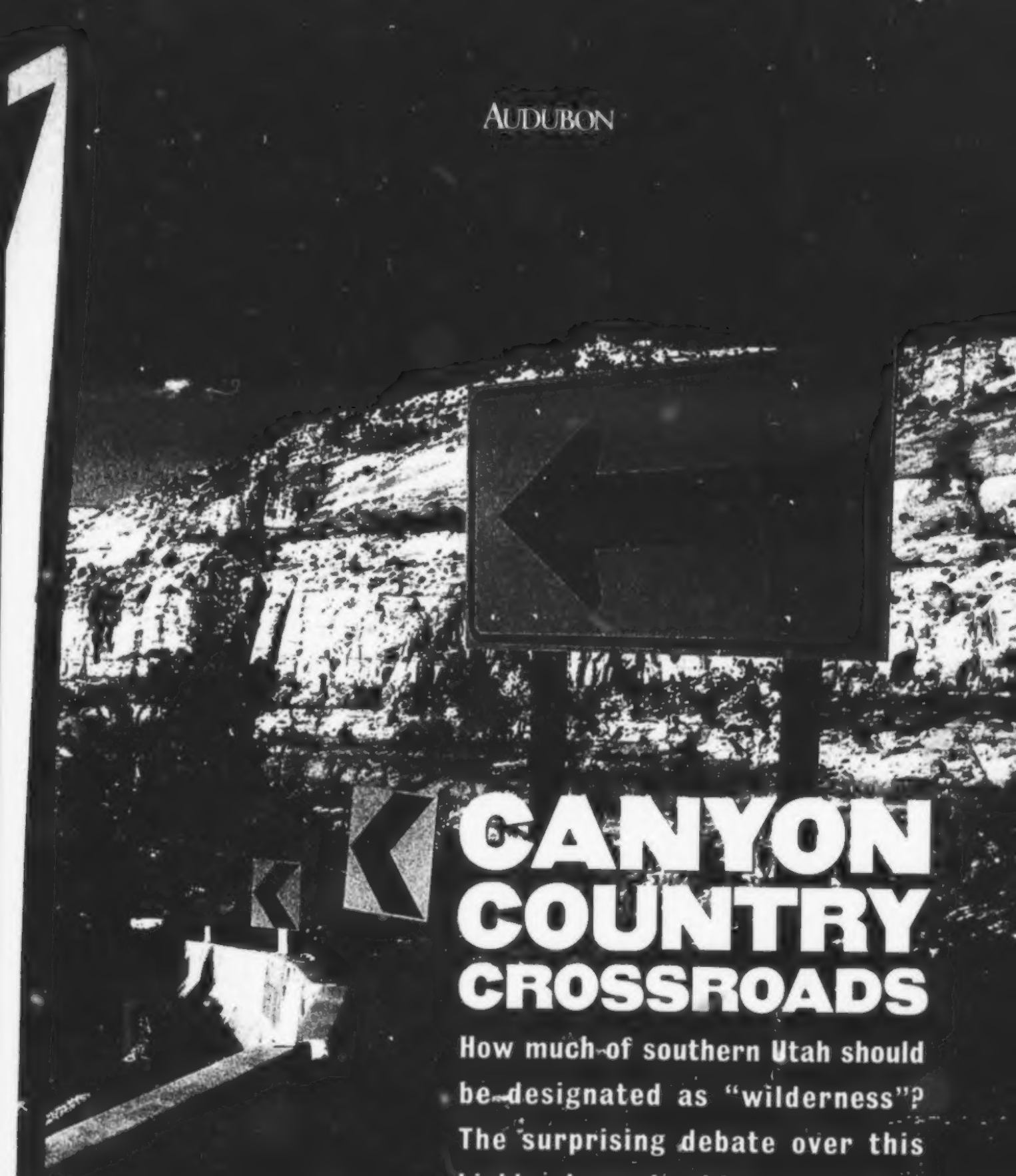
AUDUBON



CANYON COUNTRY CROSSROADS

How much of southern Utah should be designated as "wilderness"? The surprising debate over this highly charged subject is reshaping old arguments and shaping some new grassroots alliances.

BY T. H. WATKINS · PHOTOGRAPHY BY ALEX WEBB

The pianist leans into the music, urging his fingers along as they negotiate a slow-moving but complicated jazz riff he has just improvised for "As Time Goes By." He glides through the passage, then, with a sly, satisfied grin, tinkles his way to the end of the song and sends out a final soft note that echoes sweetly in the low-ceilinged room. Diners put down their knives and forks and send up a round of restrained but indisputably sincere applause.

Though the music is good enough to qualify, the pianist is not sitting in the Carlyle Hotel in Manhattan and playing to a crowd of urban jazz aficionados. The pianist is Ed Lueders, a retired professor (and writer) of poetry and literature at the University of Utah. He is playing at the Capitol Reef Inn, an unpretentious restaurant and motel situated at the western limits of Torrey, Utah. The customers include a few locals, some still in their working clothes, but most are tourists.

NEWCOMERS ARE PUSHING THE POPULATION ENVELOPES OF THE FORMER COW TOWNS AND MINING TOWNS AND FARMING CENTERS SPRINKLED THROUGH MOST OF SOUTHERN UTAH.

What has brought the tourists—and not a few of the locals—to this town, a wide spot on Utah State Highway 24 with big old arching cottonwood trees, dusty side lanes, and often rickety architecture, is suggested by the mural on one wall of the dining room, which offers a view of Utah's slickrock wilderness. This, together with the casual blend of generic country kitchen and splashy southwestern kitsch that serves as decor in the rest of the place, tells you that you are in the heart of canyon country, where the redrock meets the road and ideas of space and beauty take on entirely new dimensions.

"There's a challenge here," Lueders tells me later, sitting in the dining alcove of the house he and his wife, Deborah, have just constructed amid a scatter of piñon pine and juniper on a flat beyond the edge of town. "I guess it's because there's so much more land than there is civilization, and so much more natural hazard, as well as beauty. They go hand in hand. The challenge is to adapt to this, day to day. That sense of challenge gives something to the character of the families that are rooted here, that have fought their way through winters and wind and blowing sand."

Wind, indeed. The wind takes on power here on the Torrey flats—squeezed between the long wall of Boulder Mountain and the Aquarius Plateau on one side and the great pyramidlike humps of Thousand

ALEX WEBB/MAGNUM PHOTOS

Lake Mountain and the rusty-red escarpment of Cooks Mesa on the other—becoming as much a presence as the ancient, multicolored sandstones and shales that define the landscape. If you let your mind wander down philosophical paths, you can begin to think of it as the voice of the land itself. Living here even part-time, Lueders believes, can do that to you.

"There's a spiritual aspect to be found in the landscape," he says, "the kind that's the basis of any valid religion. I want to share this with everybody. I think people ought to have it.

"On the other hand," he adds with a rueful chuckle, "I say, like anyone else who has a vested interest, 'Go away. Don't ruin this. Don't change it.'"

It is too late, as Ed Lueders knows all too well, to ask anyone to go away. People have been coming to Utah in growing numbers for years—there were 15.5 million visitors in 1995—and there is no reason to think they will not continue to come. Spring, summer, and fall, the majority of the invaders head for the southern plateaus, where the state's most popular national parks are located—Arches, Canyonlands, Capitol Reef, Bryce Canyon, and Zion—as well as Glen Canyon National Recreation Area and a scattering of national monuments like Natural Bridges, Rainbow Bridge, and Cedar Breaks.

They come from everywhere. The voices you hear while traipsing through increasingly crowded parks

At Capitol Reef National Park (above), a view of Peek-a-boo Arch and the Henry Mountains beyond. Retired professor Ed Lueders (left) stands next to ancient Native American rock art near his home in Torrey, Utah.

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Utah's Battle of the Wilderness

Ten years ago, the Bureau of Land Management (BLM) announced that it had finally surveyed its Utah lands to see which might be added to the National Wilderness Preservation System. Out of a total of 22 million acres of public land, it had managed to discover a paltry 1.8 million that qualified for federal protection as wilderness. This would not do, declared an agglomeration of local and national conservation organizations called the Utah Wilderness Coalition (UWC), which promptly launched its own inventory.

There were at least 5.7 million acres that should be designated as wilderness, the UWC survey said. Here were the canyons of the Dirty Devil River east of the Henry Mountains, 175,300 acres of twisting mazes whose layer-cake colors and complexity rivaled those of the Grand Canyon. How could the BLM decide that only a little of this was worth saving? For that matter, how could it leave out most of the 140,000 acres surrounding Labyrinth Canyon on the Green River as it curled through several hundred million years of redrock geology? The looming eminence of Factory Butte seemed like a good thing to preserve, the conservationists decided, though the BLM had apparently found it dull and worthless. And what about the Anasazi ruins tucked into the walls and alcoves of Arch Canyon, or the tangled riparian habitat of the Escalante River as it slid past towering walls of slickrock east of the Kaiparowits Plateau? Indeed, what about the 650,000-acre Kaiparowits Plateau?

And so it went. Everywhere, the citizen survey found more wilderness worth the saving than did the BLM. Having found it, the UWC went about the business of trying to preserve it with legislation, a campaign that eventually centered around America's Redrock Wilderness Act, introduced by Representative Maurice Hinchey (D-NY) in 1993, which called for the designation of 5.7 million acres. Although wilderness advocates kept up an increasingly effective drumroll of media publicity, the bill remained mired in a legislative bog.

Then, early in 1995, the Utah congressional delegation and the state's governor, Mike Leavitt, announced plans for a "public process" to determine how much wilderness Utahans wanted to preserve. That spring, officials in counties throughout Utah held public meetings on the subject of wilderness, while U.S. Representative Jim Hansen (R-UT), chairman of the House Subcommittee on National Parks, Forests, & Lands, launched a number of hearings.

In spite of this ostensible exercise in democracy, during which wilderness advocates made themselves heard in more-than-respectable numbers, the legislation that emerged—appearing in the House as H.R.1745, Hansen's child, and in the Senate as S.884, sired by the state's Republican senators, Orrin Hatch and Bob Bennett—led to charges that the entire public-participation process had been a cynical sham.

The two bills would have protected only 1.8 million acres of wilderness. Even worse, they included language stipulating that other BLM lands in Utah "shall not be managed for the purpose of protecting their suitability for wilderness designation." In addition, conservationists feared the bills would allow pipelines, roads, even dams and reservoirs in some of the designated wilderness.

Predictably, the results appalled the members of the Utah Wilderness Coalition. More important, The New York Times *was appalled. So were* USA Today, The Washington Post, The Denver Post, *and many other newspapers that editorialized against the bills. In Utah, the conservative* Salt Lake Tribune *said the bill's authors should return to Washington "with a clear charge: The bill needs work."*

Utah wilderness was no longer just a local issue. It was national news, and the support for wilderness that erupted was broad enough to encourage growing opposition in Congress. In the House, Jim Hansen pulled H.R.1745 rather than risk a vote. In the Senate, when Hatch and Bennett tacked S.884 onto an Omnibus Parks and Recreation Act in March 1996, Senator Bill Bradley (D-NJ) filibustered against it and got enough support to kill the whole parks bill (though it was later passed without the Utah amendment).

"We will never quit until we pass our wilderness bill," Hatch insisted after Bradley's victory in the Senate. "It may take another Congress, but we will never quit." Supporters of America's Redrock Wilderness Act remain no less firm in their determination.

—T. H. W.

or even along relatively isolated backcountry trails speak in languages from all over the world. Whatever their language, most of those you hear are tourists, people who collect the sights and move on, never to return. Some, like me, are repeat offenders, plain addicts who cannot stay away from this country very long before they get the twitches and the clammydamps. Others, and there are more and more of them, have chosen, like Ed Lueders, to live in the region at least part of every year, pushing the population envelopes of the former cow towns and mining towns and farming centers sprinkled through most of the southern counties.

It was not always so, at least not in the southern half of the state. Fifty years ago, cattle outnumbered the Latter Day Saints, and the Saints outnumbered

the tourists. No more. At first, this was partly attributable to the notorious "uranium boom" of the 1950s, when prospectors from all over the world infested the region in search of uranium deposits. But most of the area's renown has been generated by several decades of promotion by both the National Park Service and the Utah Travel Council, as well as by the blossoming work of a growing cadre of writers, photographers, and artists who have discovered elements of beauty and mystery in canyon country that they find irresistible—and, not always coincidentally, eminently marketable.

What they are selling, more often than not, is wilderness—though Utah officialdom usually avoids the word itself for fear of appearing radical. Not just the wild country of the national parks, which remains a staple of the calendar and postcard and coffee-table-book trade, but that found in an expanse of land whose fate has become a matter of national concern. At stake are millions of acres of unprotected wilderness and all the wild critters contained within them—mule deer and mountain lions, coyotes and bighorn sheep, Mexican spotted owls and golden eagles, lowland leopard frogs and humpback chubs—all of it combining to make southern Utah one of the most biologically diverse regions in the United States.

The question of what is going to happen to all that wilderness and wildlife has added to the confused mix of dismay and hope for the future that so many in the region feel. Indeed, it could be argued that the decade-long fight over how much federal

A sandstone monolith in the redrock country south of Kanosville, Utah.

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land in Utah should be designated as wilderness (see "Utah's Battle of the Wilderness," page 42), particularly the attempt to get every citizen involved in the discussion through public hearings, may in its own way have been an agent of change almost as significant as the pressures of population growth and tourism. It may have kicked in the beginnings of dialogue and helped get the citizens of southern Utah thinking about the future of their region more seriously than ever before.

Some of the wilderness hearings were noisy affairs, with much waving of placards and the kind of angry rhetoric that glows in the dark. On the surface, then, the fight would seem to have given even more ammunition to those (particularly the national media, ever in search of sound-bite wisdom) who favor a simpleminded depiction of the region as one locked in a virulent clash between environmentalists, usually presented as well-meaning but naive urban elitists insensitive to rural values, and the sturdy descendants of local pioneers, whose social and political instincts may be a little primitive but whose struggle to resist change has about it a kind of lonely, misguided heroism.

Things were—and are—a good deal more complicated than that. Consider what I saw one evening in the spring of 1995, when I attended a hearing held by the Grand County Council in Moab's hilltop community center. In the middle of one of the place's two big adjoining rooms were long tables on which Bureau of Land Management maps had been spread. More maps were propped up on easels or pinned to the walls. The other room held several dozen auditorium chairs and a table, behind which sat the Grand County Council members. People milled about, poring over maps, huddling in small knots, leaning close to one another to talk. Every now and then a name would be called out and someone would go to the council's table, sit down, and make a case for or against wilderness in Grand County, Utah.

There was the usual collection of environmental-

Katie and Mark Austin, owners of the Boulder Mountain Lodge, with daughter Audrey. Pete's Stop (right) is one of three gas stations in Hanksville that cater to tourists.

ists, real estate agents, and local mercantile go-getters. But among the crowd were a few ranchers who John Wayned up to the table in mud-caked boots, limp-brimmed old Stetsons, dirty blue jeans, and work shirts that had seen better days. What I found surprising was not that the ranchers were against wilderness designation but that they were there at all—and not only there, but there to discuss things with outward citizenly calm. It had not been that long, after all, since the word *wilderness* had rarely passed the lips of such men as anything but an obscenity, and since Clive Kincaid, the first president of the feisty Southern Utah Wilderness Alliance (SUWA), had been hung in effigy down in Escalante and other environmentalists allegedly shot at from time to time (warning shots, we can hope; in southern Utah, cowboys tend to hit what they aim at). Yet here they were, talking.

The Moab hearings were not necessarily typical, and surely the debate over the future of southern Utah's wildlands will continue to bubble fiercely in the months (and years) to come. We can expect to see a resurgence of ugly contention between Wise Use groups and environmental organizations such as SUWA. Indeed, one such fight is shaping up right now over the Kaiparowits Plateau, which contains both a lot of potential designated wilderness and a lot of coal. A European-owned corporation called Andalex Resources wants to develop a 10,000-acre underground coal mine in the southern portion of the plateau. The mined coal would be trucked across the plateau, then sent by rail to California for shipment to markets in Asia. The proposal is supported by the Utah congressional delegation and the usual clutch of local entrepreneurs. But in the little town of Boulder, not far from the plateau, environmentalist Mark Austin succinctly predicted a battle of potentially epic proportions, something to compare with that over old-growth forests in the Pacific Northwest. "Over my dead body," he told me grimly. "Whatever it takes, that ain't going in. End of story."

But is it the end of the story? Is ear-biting confrontation forever going to dominate environmental politics in Utah, and is uncontrolled growth going to spell an end to both wilderness and the hope of a sustainable life? Possibly not. And if not, it will be because so many people in southern Utah seem to be asking these kinds of questions of themselves and one another for the first time.

Because of the wilderness fight, much of the nation is watching what goes on down here—and thinking about Utah. Like me, for instance. I returned to canyon country early in May this year. I was getting another fix to relieve my addiction to the place, but I was also there to look a little more closely at how things might have changed since I first widened my eyes and heart at the sight of slickrock.

Change seems to be much on the minds of people in southern Utah today, as it is in much of the West, where conflict resolution and coalition-building over the question of public-land use are growth industries. Sometimes it just doesn't work. It didn't in Emery County, Utah, where after months of discussion and planning, county officials and the Southern Utah Wilderness Alliance remain at loggerheads over wilderness designation versus less restrictive land covenants that would allow expansion of a local electric plant.

Even so, many people are suddenly aware that the freewheeling traditions of the past are not going to serve the future very well and that they had better start dealing with change. Counties have been developing master plans; these have been accomplished with varying degrees of effectiveness, but at least they have been done, most with all sincerity. And in spite of all the hollering and arm-waving in the past year and a half over the Utah-wilderness bills before Congress, most people, I found, seem to accept the coming of wilderness protection as inevitable—though just how much remains uncertain.

Of more immediate concern are the consequences

"WE SAT UP ON THIS HILL, AND WE COUNTED THE CARS," RECALLS RAY POTTER. "I SAID, 'DIANE, THIS WOULD BE A GOOD PLACE TO BUILD A MOTEL.'"

D904

of unanticipated growth and a fast-changing economic foundation. Overall in Utah, mining and other extractive-industry jobs declined between 1979 and 1993, while nonextractive employment—finance, light industry, state and federal government service, tourism—grew by 360,000. Tourism, in fact, is now Utah's most important industry, employing an estimated 69,000 people and generating $3.5 billion in annual revenue.

What is true for the state in general is true of southern Utah in particular, including the "corridor" of State Highway 12 that curls 114 miles through mountains and across plateaus from U.S. 89 just below Panguitch on the west to a junction with State Highway 24 at Torrey on the east—the principal access to Capitol Reef National Park from the west. The corridor brings drivers to the edge of Bryce Canyon National Park and Cedar Breaks National Monument and otherwise carries them over some of the most spectacular unprotected landscape anyone could hope to find. For decades most of the road was dirt and gravel, but in 1986 the state paved it, and Highway 12 became a "scenic byway" that could be negotiated, however cumbersomely, by even the most elephantine RV.

Rancher Dell LeFevre fears that he may be forced to sell his land, probably to developers. "I don't want that," he says. "It would tear my heart out."

At about the same time, the importance of the corridor's traditional industries began to decline. A combination of persistent drought, low prices, and market monopoly had put local cattle ranchers dead up against it. Dell LeFevre, whose family has been farming and ranching in the Boulder area since the 1850s—and who, in spite of his opposition to wilderness designation, is described as "one of the good guys" by a local environmentalist—fears that he, like others, will be forced to sell his land outright, probably to developers of one kind or another. "I don't want that," he says with utter sincerity. "It would tear my heart out. I just wouldn't be the same Dell LeFevre if I had to sell that land and give up the cattle business."

To avoid that possibility, he is working with the Colorado Plateau Sustainable Communities Corporation, a nonprofit group that attempts to help guide local communities in the search for sustainable kinds of economic development. What LeFevre and the corporation hope to do is develop a market for Boulder Beef—high-quality "natural beef" free of steroids and other chemicals that raise the hackles of pure-food folk—to be sold mainly to high-end restaurants in Utah and elsewhere.

The Colorado Plateau group is also working with small-scale timber operators and mill owners like Adus Dorsey and Stephen Simmons in Torrey, who recently joined with several other loggers and mill owners in the region to form the Southern Utah Independent Forest Products Association. For years, Dorsey says, small operators had been getting the leavings from the big timber sales promoted by the Forest Service in Dixie and Fishlake national forests. They had eked out a living mainly by supplying timbers to the mining industry. Then the mining industry started changing its technology, the market for timbers declined, and the timber operators, like the ranchers, faced hard times. But now, aided by grants from the state and the Forest Service that enabled them to hire a consulting firm and encouraged by new Forest Service policies, Dorsey and the other association loggers and mill owners hope to develop a market for flooring, roundwood furniture, cabinets, specialty fencing, and other "value-added" wood products.

Such grassroots efforts may or may not keep at least some traditional industries, such as ranching and small-scale mining, alive in southern Utah, but the region's future probably lies in other directions. Ray Potter has seen what that could mean. On a Sunday afternoon 10 years ago, he and his wife, Diane, went to a bluff overlooking the intersection of Highways 24 and 12, just east of Torrey. Potter, born in nearby Loa into a Mormon ranching and farming family, was then a highway construction engineer for the state and had helped to pave Highway 12. "We sat up here on this hill, and we counted the cars," he remembers. "I said, 'Diane, this would be a

good place to build a motel.' After that we couldn't talk or think about anything else."

The result was a complex that now includes not only the Wonderland Inn, with its indoor pool, conference center, restaurant, and 50 rooms, but a service station and convenience store at the bottom of the hill. "I would say that Highway 12 traffic has tripled since we started to build here," Potter says.

With traffic has come opportunity, and not just for the Potters. There is another gas station sitting across the road from theirs now, and next to it a new motel has sprouted. Down on Highway 24 toward Capitol Reef National Park, ground has been cleared for a big new Holiday Inn. "The availability of lodging rooms in the Torrey area," Ray Potter exclaims, seeming a little astonished when he thinks about it, "has increased from twenty-eight in 1989 to two hundred and fourteen now—and there are only a hundred and sixty people in the whole town."

Thirty-five miles away, across Boulder Mountain on Highway 12, Boulder also is feeling the effects of growth. It was founded as a Mormon ranching community in 1894, and when I first encountered it eight years ago it seemed to have changed little from its origins. Situated in a beautiful little valley, the town then enjoyed two main attractions: Anasazi Indian Village State Park's prehistoric site and the tiny Burr Trail Cafe, where Billie Jones specialized in bargain meals that would founder a horse. "Feed me!" I used to cry, crawling up on a stool after four or five days of solitary backpacking in the canyons of the Escalante River. And so she did, mounding up the food and serving it while bantering cheerfully with cowboys, truck drivers, and a few tourists.

The Anasazi state park is still there, and so is Billie; and if her prices have gone up a bit, the food still weighs down your plate. But there are fewer and fewer truck drivers and cowboys now, and more and more tourists. At breakfast, lunch, and dinner, the cafe's five tables and seven stools never seem to cool. "We're busy all the time," Billie says, shaking her head, though whether in pleasure or regret I can't

Cattle rancher Dell LeFevre at his home in Boulder, Utah, with 2 of his 12 adopted children; his family has been farming and ranching in the area since the 1880s.

MAP BY JONATHAN R. FOSTER

tell. "All the time." Up the road is a motel that wasn't there eight years ago. Right across Highway 12 from the cafe, a German developer is planning a 50-room motel, as well as an RV park and a laundromat. And behind the cafe is the Boulder Mountain Lodge, a 20-room resort artfully crafted from local wood and stone and snuggled against a nine-acre pond sweet with the sound of birdsong.

The two-year-old lodge is the work of environmentalist and entrepreneur Mark Austin, who with his wife, Katie, bought the entire pond in order to keep it preserved as a wetland. They have also purchased 900 acres on the mesa that rises just behind the lodge; they intend to keep 90 percent of that as open space. "You have to own it to zone it," Mark Austin tells me as we sit by the pond watching yellow-headed blackbirds, ruddy ducks, swallows, and redheads go about their business. The town has virtually no zoning regulations, he says, and those that do exist are indifferently enforced. He is certain that if he and Katie had not bought the land, sooner or later the rim of the mesa would have been alive with condominiums. "I keep a file of people who have come by here and inquired about property in Boulder," he says. "I counted it the other day, and it had five hundred and sixty-two names—including Las Vegas types. They put an arm around me and say, 'Yeah! This would make a hell of a nice place to put in some condos and golf courses.'"

Austin, a veteran of the conservation wars of the Reagan years, has managed to combine careers as a well-respected contractor and an outspoken environmental activist. His activism in defense of wilderness has made him some enemies among the locals. But it does not appear to bother him much, and his impatience with the town's lackadaisical zoning traditions is echoed by Billie Jones, who agrees that if "they don't start getting ordinances, you're going to see such a boom around here that it's going to be another Sun Belt."

Larry D. Davis, who has lived in the town with his family ever since he took a job 26 years ago as

Sawmill operator Ades Dorsey (below) and area loggers are working to develop new markets for local timber. At the Desert Inn Motel (right), sculptures greet the tourists.

the first and so far only manager of the Anasazi state park, wants as much of Utah's federal lands designated wilderness as possible and hopes he will live to see it. He is less sanguine that Boulder will be able to retain the essentially rural, untrammeled character that has made it such a good place to live. "I hope so," he says one morning, his little museum already filling with tourists, "but there's people with money coming around, and money seems to talk. I would hate to see this place turn into another Moab. What does it take to scare people?"

Moab scares people plenty. It scares Ray Potter in Torrey. "Most people around here think, 'Nobody can tell me what to do on my property,' " he says. "We've had zoning meetings and basically they've failed." That can't go on, he believes, because if it does, his town could become like Moab.

Poor Moab. It seems to have become a symbol of the region's ambivalence toward growth. Situated in a lovely long valley along the Colorado River, it too was once a Mormon farming and ranching town. Then a prospector named Charlie Steen found a mine he called the Mi Vida in the early 1950s, and for more than a decade Moab was the raucous center of a rattling good uranium boom. That boom died, and the town's growth stalled until a recreation boom hit in the 1980s. Moab hasn't stopped growing since.

Bill Hedden, a Grand County Council member who is committed to the need for planning, gets a little irritated when I tell him that people cite Moab, the county seat, as the place they don't want their towns to become. "I think a lot of those people have never even been here," he says. "What they're really saying is that they're afraid of change. We've seen a tremendous amount of change here, there's no question about it, but change is a mixed bag. Moab has actually got a lot of charming things going on right now." He emphasizes cultural events, good restaurants, and some economic diversification. Still, he acknowledges that the town's oldest residents, who remain in political power, are still so resistant to the notion of planning and development restrictions that they are in danger of eliminating themselves. "Their policies," says Hedden, "will eventually result in taxes so high [because of the need for new services] that the old-timers are going to be very hard-pressed to keep living here."

The effects of those policies are evident on a May afternoon, when it is easy to see why people in other towns chant Moab's name like an ominous mantra. In the crowded, crawling weekend traffic, dusty local pickups are outnumbered by apartment-building-size RVs bound for Canyonlands and Arches and by herds of cars and four-wheel-drive vehicles antlered

with bicycle parts, most on their way up to the Sand Flats, a section of land set aside for mountain bikers in the hills above town. Main Street is one long strip development, the architecture of whose motels and restaurants and shopping centers and coffee bars and gas stations stretches the ability of *eclectic* to describe it. "This isn't a community anymore," laments Jim Stiles, the publisher and editor of *The Canyon Country Zephyr*, who has lived in Moab for 20 years, "it's a population center."

So with economic and demographic changes coming faster than they can be tracked, the people of southern Utah try to puzzle out their future with a mixture of anxiety, hope, anger, and wonder. But possibly with something else, too. "There's a certain pride about this country that Utahans have," says Ed Lueders, the retired professor–piano player in Torrey, "people who have been here a hell of a lot longer than I have."

I found that pride everywhere I went, in everyone I talked to, including those who said they hated the idea of wilderness. Pride can be a powerful tool, and maybe, before the last little town is corrupted and the last unroaded wilderness is given over to dreams of profit, maybe it *will* be pride, finally, pride in the land for its own sake and for what it holds of beauty and joy and spiritual redemption, that will make southern Utah not a battlefield but a revelation. ■

"This isn't a community anymore," Jim Stiles, publisher and editor of the local weekly newspaper, says of Moab. "It's a population center."

LETHAL MIGRATION

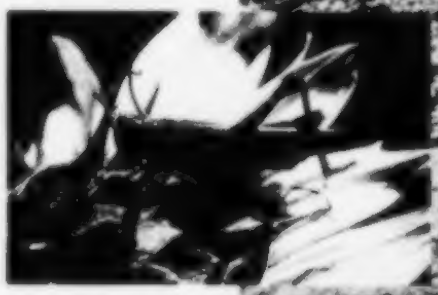
THE POISONING OF 20,000 SWAINSON'S HAWKS IN ARGENTINA LAST WINTER ALERTED SCIENTISTS TO A DEADLY PROBLEM: THE EXPORT OF PESTICIDES BANNED IN THE UNITED STATES IS KILLING MIGRATORY BIRDS. **BY LES LINE**

BRIAN WOODBRIDGE, an endangered-species biologist with the Klamath National Forest, in northern California, has a home video he shows to people who ask him about the Swainson's hawk problem. The landscape looks awfully familiar—Kansas in summer, perhaps—with windmills sprouting from ruler-flat farmlands, birds of prey hunting from weathered fenceposts, crop dusters skimming fields of alfalfa, and ominous clouds advertising the chance of tornadoes.

There are events in Woodbridge's video, however, that could never occur in the North American midland. In one staggering sequence, the darkening sky is literally filled with Swainson's hawks swirling into a grove of eucalyptus trees, seeking shelter from an imminent storm. (Observers estimated that 12,000 hawks left the two-acre stand the next morning.) Then, in a grisly scene, a scientist is shown sorting through an immense pile of fresh hawk carcasses that had just been discovered beneath another roost.

This is Argentina's pampas, where most of the Swainson's hawks in the United States and Canada migrate to escape the rigors of the northern prairie winter—and where thousands of them have perished in recent years from exposure to acutely toxic chemicals that the local farmers use to kill grasshoppers, which are the birds' prey during the austral summer.

Last January, in the worst kind of wake-up call to an environmental community that had become more or less complacent about pesticide threats to birdlife, some 4,000 dead hawks were found at just four sites about 280 miles west of Buenos Aires by Woodbridge; Michael Goldstein, a graduate student in wildlife toxicology at Clemson University, in South Carolina; and Argentine colleagues. A conservative estimate is that 20,000 birds—about 5 percent of the world's Swainson's hawk population—



In the Argentine pampas, toxicology student Michael Goldstein (below) examines a dead Swainson's hawk killed by exposure to monocrotophos. The pesticide, used in Argentina to kill grasshoppers that eat sunflowers (below left), is produced by the Ciba-Geigy company under the name Nuvacron.

CLOCKWISE FROM TOP: GARY BRAASCH; RICARDO MALTA/BLACK STAR (TWO); MITCHEL GOLDSTEIN

Clockwise from left: Two-week-old Swainson's hawk nestlings in the Klamath National Forest, in northern California; Klamath biologist Scott Baker at the nest; irrigation lines in California's Butte Valley, which provide a perfect perch for the hawks; a female hawk tending her nest in a juniper tree in the Klamath forest.

GARY BRAASCH (ALL)

The tracking of Swainson's hawks from California led to the grim discovery of dead hawks in Argentina last January. In the sequence above, a Swainson's hawk flies into a mist net placed by federal biologists in Butte Valley National Grassland, in California; a hawk is carefully removed

bald eagle and peregrine falcon populations in the decades after World War II, when the chemical was a cheap panacea for everyone's insect problems.

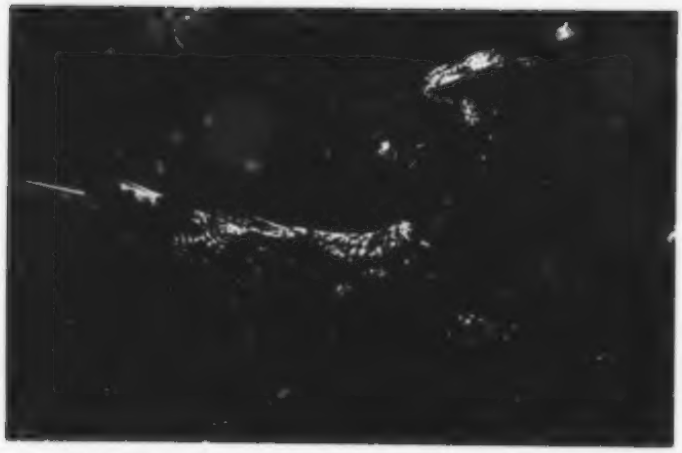
Organophosphates (OPs in fieldspeak) and carbamates, on the other hand, "are generally considered to be nonpersistent, nonbioaccumulative, and of low risk for secondary poisoning of raptors from eating intoxicated or dead animals," explains Charles Henny, a scientist with the National Biological Service in Corvallis, Oregon. These highly toxic but short-lived insecticides, which are similar to nerve gas, have largely replaced organochlorines on the world market. But Henny complains they have received little attention from raptor researchers, who "continue to conduct four out of five studies on the banned chemicals." He says, "They pooh-pooh the idea that OPs are a serious problem. Most OP bird kills go unnoticed because few people are looking for them."

Monocrotophos is one of the OPs that no one worried about.

THE RANCHER TOLD RESEARCHERS THE HAWKS DIED AFTER A SUNFLOWER FIELD NEXT TO THEIR ROOST WAS SPRAYED WITH MONOCROTOPHOS.

"AN ALFALFA FIELD and a juniper tree for their nest—that's all a pair of Swainson's hawks need for their home range," says Brian Woodbridge, pointing to a circle of green where spray from a center-pivot irrigation system glistens in the morning sun. His vantage point is a 200-foot-high, juniper-clad pimple on the floor of Butte Valley in extreme north-central California, the westernmost stronghold of this slender buteo of prairie, plains, and desert. Once, before settlers arrived with their cattle and sheep, the 160-square-mile basin—30 miles north of the snow-crowned loft of Mount Shasta—was rich in alkaline wetlands and native grasses. Today rings and rectangles of alfalfa dominate the cultivated cropland in the near view from the knoll, while the sagebrush range in the gray distance is part of Butte Valley National Grassland, administered from the U.S. Forest Service office in Yreka where Woodbridge hangs his hat.

The 38-year-old biologist has an expert's perspective on events in Argentina and how they relate to the year-round dependence on agriculture of the modern-day Swainson's hawk: He has studied Butte Valley raptor populations since 1983 with the cooperation of private landowners, who are mostly delighted to have the birds around because their main prey during the nesting season—a dusty, prolific



and fitted with an aluminum band, which will be used in identifying it after its winter migration through Central Am..rica to South America. After banding the hawk, U.S. Forest Service biologist Brian Woodbridge (below) releases it back into the wild.

GUY BRAASCH (ALL)

rodent called the Belding's ground squirrel—is an alfalfa grower's nightmare. Woodbridge has also banded more than 1,000 Swainson's hawks and has watched the number of marked adults that make it back to the basin from their South American sojourn decline dramatically in recent years.

This June 65 pairs of Swainson's hawks had nests in Butte Valley, along with some 140 pairs of red-tailed hawks, their larger and more robust relatives. The two buteos share squirrel-hunting perches on the wheels of spurting irrigation lines with an astonishing number of eagles. "Free food and a shower," quips Woodbridge at the sight of a rig weighed down with assorted birds of prey. A few seconds later, an adult golden eagle slams into an immature bald eagle holding a squirrel in its fist. There's no apparent reason for the attack other than a bully's mean streak. The field is chockablock with the short-legged, 10-inch-long rodents, whose numbers in Butte Valley are unimaginable—as many as four squirrels per square yard. That's 800,000 ground squirrels in a 50-acre plot, and Woodbridge says, "They can devour sixty percent of the farmer's first cutting." Sharpshooters in roving pickup trucks kill thousands of ground squirrels with scoped .22 rifles without making a discernible dent in the population. Hawks simply sit on the ground next to squirrel holes, waiting for the residents to pop out.

But ground squirrels, however abundant, are an ephemeral food source. Adult squirrels emerge from hibernation in February and March, Woodbridge says, and their offspring appear above ground in April, just as the first hawks return from Argentina. But by early August, about the time the young Swainson's hawks are leaving their flimsy nests, most of the squirrels—larded with fat for another seven-month snooze—have retreated back into their burrows. Until the hawks return to their breeding grounds the next spring, grasshoppers will be their bread and butter. The biologist notes that immature grasshoppers can't fly and fledgling hawks simply run them down in the grass. By late July, though, the insects begin to swarm on afternoon thermals, where the hawks snatch and eat them in midflight at a rate of as many as six a minute. "The birds are starting to shift from raptor mode to seagull mode," says Woodbridge, recalling the flocks of California gulls that saved Mormon crops from a locust plague in the 19th century.

The Mormons, of course, didn't have a supply of deadly insecticides at hand to fight the grasshopper invasion. That's decidedly not the case in Argentina, where some 400,000 Swainson's hawks arrive in November. The raptor's local name is *aguilucho langostero* (the hawk that eats locusts), and Woodbridge says it's a common sight to see a flock of Swainson's hawks spiraling down to earth at the first sight of a tractor stirring up clouds of grasshoppers from a field. The tractor, he adds, could well be towing a spray rig filled with monocrotophos.

> THE PROBLEM LIES WITH AN INTERNATIONAL MARKETING SYSTEM THAT SUPPLIES [FARMERS] WITH INAPPROPRIATE CHEMICALS."

UNTIL THE WINTER of 1995, all that was known about the fall migration of Swainson's hawks was that flocks numbering in the thousands streamed southward along the mountainous spine of Central America, accompanied by equally large numbers of broad-winged hawks. One observer, using photographs, counted more than 340,000 Swainson's hawks passing a point near Panama City in October and November 1972. But the species' distribution and ecology during the austral summer was a blank chapter in its life history, and biologists could only speculate about what events during the nonbreeding season might be contributing to the population declines.

Then, in July 1994, Woodbridge fitted two Swainson's hawks from Butte Valley with one-ounce radio transmitters powerful enough to be monitored by weather satellites. From tracking data relayed on the Internet, he followed the birds' migration from northern California through Mexico, El Salvador, Nicaragua, Brazil, and Bolivia to Argentina. One radio-equipped hawk settled near the town of Colonel Hilario Lagos, in La Pampa Province. Woodbridge and two volunteers followed a few weeks later to set up a study area and connect with Argentine scientists and local estate owners.

"The study area supported a spectacular concentration of Swainson's hawks," Woodbridge says of his first visit, in January 1995. "We located a number of communal night roosts in eucalyptus groves that had been planted around ranch buildings or as windbreaks. Several of the roosts contained anywhere from two thousand to seven thousand hawks." During the cooler morning hours, he explains, the hawks leave their roosts to feed on the ground on a small grasshopper that Argentines call *tucura*. Then, as the air warms, bands of hawks begin to forage on the wing until flocks numbering 1,000 or more birds are soaring on the thermals.

But the researchers made a grim discovery under one roost: the remains of more than 700 Swainson's hawks, including a bird banded in Colorado in 1975, another from Saskatchewan, and a third wearing color bands identifying it as one of Woodbridge's hawks from Butte Valley. "The ranch owner told us the birds died after a sunflower field next to the roost was sprayed," he says. "Other farmers said they had noticed large hawk kills as far back as the late 1980s." And agriculture officials told the Americans that pesticide use to control grasshopper hordes would increase dramatically because Argentine farmers are under intense economic pressure to switch from cattle grazing and hay production to high-yield crops such as sunflowers and soybeans for the international market. That jibes with the FASE report, which shows that exports of hazardous pesticides to Argentina soared [*Continued on page 94*]

This is San Xavier del Bac, just outside of Tucson.
They call it the "White Dove of the Desert".
I don't know what's more beautiful– the Mission itself
or the captivating smiles of the little children I met.

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0946

Whale Watcher

For two decades photographer Jeff Foott, a former marine biologist, has tracked the large mammals of the world's oceans, especially two species he has followed from Argentina to Alaska: the humpback whale and the orca.

PHOTOGRAPHY BY JEFF FOOTT

An orca (left) "spy hops," poking its nose out of the water to inspect the photographer's boat. A humpback (below) breaches in what scientists consider a form of play. The behavior may also serve to communicate with other whales.

0918

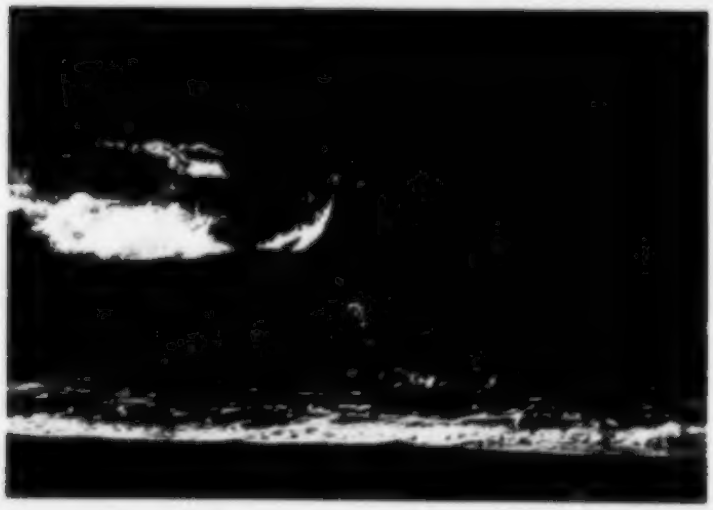
Orcas, or killer whales (once called whale killers because of their diet), are actually the largest and fastest members of the dolphin family. Humpbacks are celebrated for their plaintive songs and acrobatic feats.

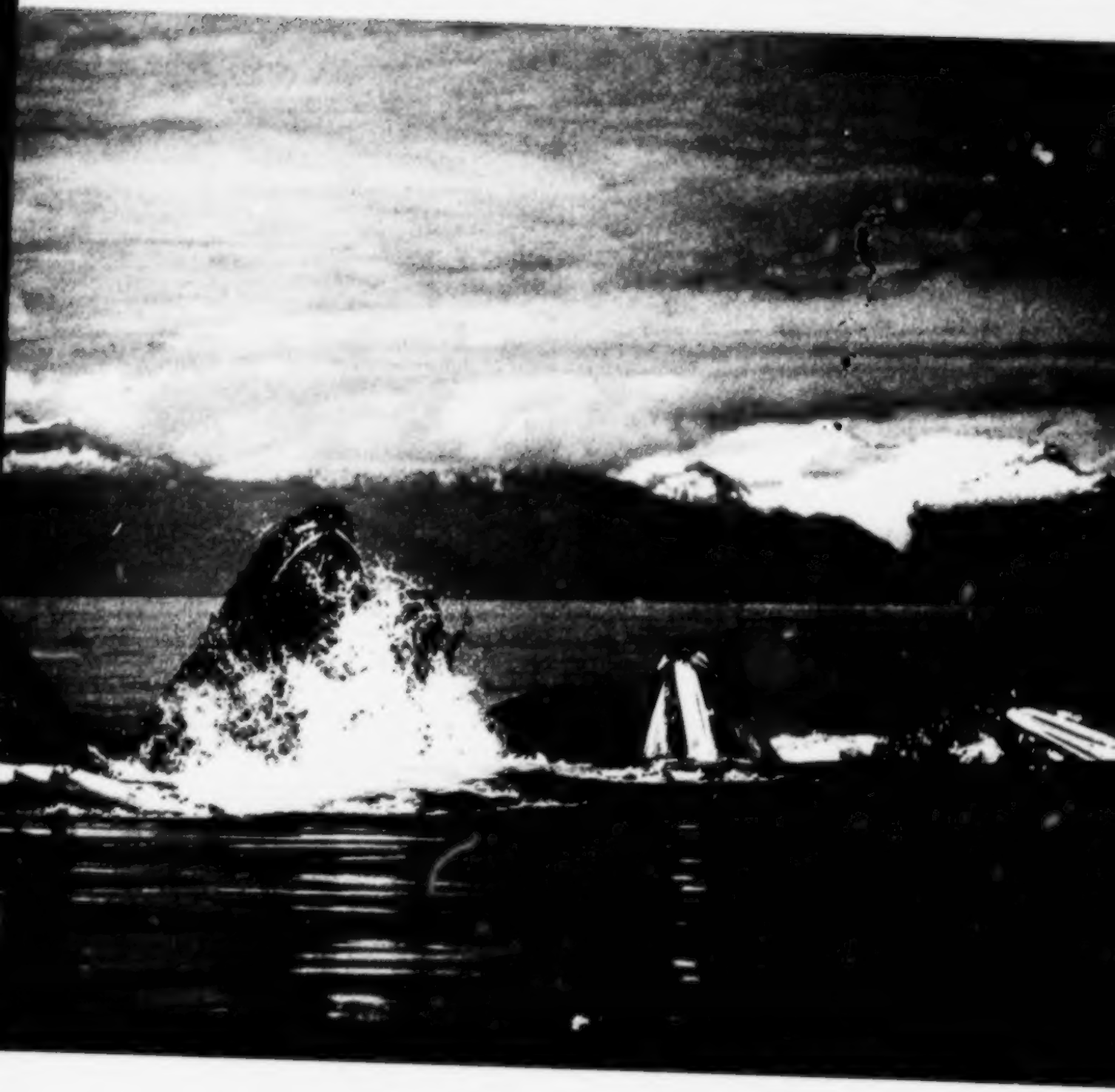
Blowing enables the humpback whale (above) to exhale carbon dioxide. When diving (below), it must hold its breath rather than extract oxygen from the water as fish do. A streamlined orca (left) glides through the ocean.

The upward stroke of a powerful tail propels humpback whales through the water—unlike fish, which rely on their tail's side-to-side movement. The whales' flexible bodies reduce turbulence and drag

0922

Humpbacks engage in cooperative feeding (above and right), which is more efficient than individual hunting; they herd their prey by encircling it with a net of bubbles. Though orcas will hunt quarry such as a sea lion (below left and right) in shallow waters, they seldom beach themselves and never attach humans.





Similar species with different appetites: The humpback eats plankton and fish such as mackerel, herring, and sardines, while the orca preys on porpoises, sea lions, and other warm-blooded animals.

PHOTOGRAPHY BY PATRICE HALLEY

more than any other American place, symbolized just how horribly we had become our own polluting enemy.

In September 1813, Commodore Perry's ragtag fleet sailed on a blue, clear lake teeming with fish. But within a century and a half the Great Lake called Erie was lined with steel mills, refineries, factories, and sewage outfalls, and it was so befouled with pollution, so deoxygenated and choked with algae, that it was widely labeled dead.

By the standards of the Great Lakes, Erie is something of a runt—shallowest, smallest in volume, second-smallest in area. But by any other standard it is gigantic, the 12th largest of the planet's lakes, its area larger than eight U.S. states. The view of the churning lake from the monument tower was spectacular enough the day of my visit. But it was the view downward that impressed me the most. Below, a pair of fishermen in a motorboat were working slowly along the small, sheltered, calm Put-in-Bay.

My companion, John Hageman, who manages Ohio State University's F. T. Stone Laboratory, a research site on the island, confirmed that beneath the boat, we were looking

into about 10 feet of clear water—clear water, and fishermen, on a Lake Erie that two decades ago was as greenly opaque as a pot of pea soup. "Twenty years ago," he said, "the visibility was maybe a few centimeters."

A few days later I found myself on Captain Wayne Bratton's charter boat on what once was an infamous source of some of Erie's worst pollution, the tributary called the Cuyahoga River. Bratton was motoring his 65-foot boat, the *Holiday*, through a section of downtown Cleveland called the Flats, where the river meanders into the lake. Upstream, through a series of iron lift bridges at the limit of lake-going navigation, he had shown me the railroad trestle where on June 22, 1969, the river became a subject of international ridicule. Sparks of molten steel from a steel-mill railcar hit the oil-slicked, garbage-clogged water, and absurdly, the river burst into a fire so intense that it severely damaged the trestle. ("Roll on, flaming river," songwriter Randy Newman would later sing in a mocking tribute.)

"This river used to be almost black," said Bratton, who spent years as a licensed master, piloting and captaining giant Great Lakes ore ships. "It used to bubble like a cauldron." That, he said, was from all the methane gas that the foul river sediment used to produce.

It was a spring morning after days of rain upstream, and the river was running a muddy brown. But the Cuyahoga is no longer a fire hazard. In fact, the shoreline of Cleveland's Flats area at the river mouth has metamorphosed from a reeking industrial zone into a waterside entertainment district lined with nightclubs and bistros, with tables on decks at riverside and tie-ups for pleasure boaters. Just upstream, as

it runs through Cleveland, the Cuyahoga is still what Bratton calls a working river, channeled through sheet-steel pilings, its banks lined with factories and mills. But Bratton, who has guided up the river everyone from school groups to U.S. Interior Secretary Bruce Babbitt to the Greenpeace boat *Beluga*, now only half-wryly calls it "the scenic Cuyahoga."

So here's part of the news: Lake Erie and the Cuyahoga are still a symbol, this time of environmental hope. But at the same time, the lake and its watershed continue to be a perfect symbol of our environmental paradox. Once, these waters represented damage by the kinds of pollution most visible: sewage and oil and chemical spills. Now they symbolize just how complex environmental conundrums can be, for even as tough regulations and pollution-control programs have cleansed these waters, new problems have emerged.

Today, toxic chemicals dumped years ago into the lake and its tributaries remain, buried in sediments or, worse, laced into the tissues of the ecosystem's living organisms. At the same time the lake, like many parcels of American nature, is beset by a kind of biological pollution, especially by a prolific species called the zebra mussel, which is no larger than your thumbnail but is so ecologically alien that its rampant reproduction threatens to alter this Great Lake's character, perhaps forever.

Erie was the last of the Great Lakes to be "discovered" by European explorers and fur trappers. Its shores remained minimally developed, surrounded by forests and vast wetlands, for the better part of two centuries. Surveyor Moses Cleaveland landed on the Cuyahoga's shores at the swampy site of the future city of Cleveland in 1796. By 1820 only 600 hardy residents lived in the remote town. But in 1825 the Erie Canal opened, effectively linking the Midwest with New York City. The cost of moving goods plummeted, settlers streamed west, and a period of explosive population growth began in the Great Lakes region.

By 1850 Cleveland's population had grown to more than 20,000, doubling within another 10 years and continuing to boom as its economy shifted from shipping timber and farm goods to steelmaking and John D. Rockefeller's oil empire. By 1930 it was the fifth-largest city in the United States, with 900,000 residents. In Buffalo, on the lake's east side, Toledo on the west, Detroit a short stretch up the Detroit River, and Akron on the Cuyahoga, the boomtown scenario, based on glass or rubber tires or car parts or automobiles themselves, was similar. Beyond the cities, during the 1800s,

IN 1969 SPARKS OF MOLTEN STEEL HIT THE OIL-SLICKED, GARBAGE-CLOGGED CUYAHOGA, AND THE RIVER BURST INTO FLAME. "ROLL ON, FLAMING RIVER," WROTE RANDY NEWMAN AS THE INCIDENT TURNED INTO AN INTERNATIONAL JOKE.

On the Cuyahoga: The river's narrowest section runs through an industrial area of Cleveland. A tugboat assists a barge loaded with limestone (left). The Cleveland skyline, seen from the river (top left). Beaches like the one at Edgewater Park (above) were often closed during the late 1960s.

D938

settlers had ditched and drained the wetlands and axed great expanses of ancient hardwood forest, plowing the land that remained and in the process creating some of the most productive farms on the continent.

But it came with a cost. Eroded soil streamed from the plow-broken fields down ditches into the rivers and eventually to the lake, spewing muddy plumes of silt far out into once-clean waters. By 1850 the Cuyahoga was clogged with urban pollution, from human sewage to coal residue to offal from slaughterhouses, including, sometimes, whole animal carcasses. It was "slimy in August with all manner of impurities floating on top," as one disgusted observer wrote. Typhoid epidemics, spawned by filthy waters, raged through the region.

There were other early warnings of trouble in the lake. During the pioneer days, soldiers at Fort Maumee, the site of present-day Toledo, could catch fish in the teeming lake by randomly throwing spears into the water. By 1863 one writer complained that it had once been "not unusual to capture 100 bass and walleye by hook and line in a few hours, now this is no longer possible at all."

By the middle of this century, Lake Erie was choking on the residue of industrial prosperity. In the 1960s a quarter-million tons of waste solids and 170,000 tons of oil and grease were spewing into the lake each year from the Cuyahoga alone—only a fraction of the cumulative filth that poured in from such rivers as the Ashtabula, the Maumee, the Black, and especially the Detroit, which drains the upper Great Lakes into Erie.

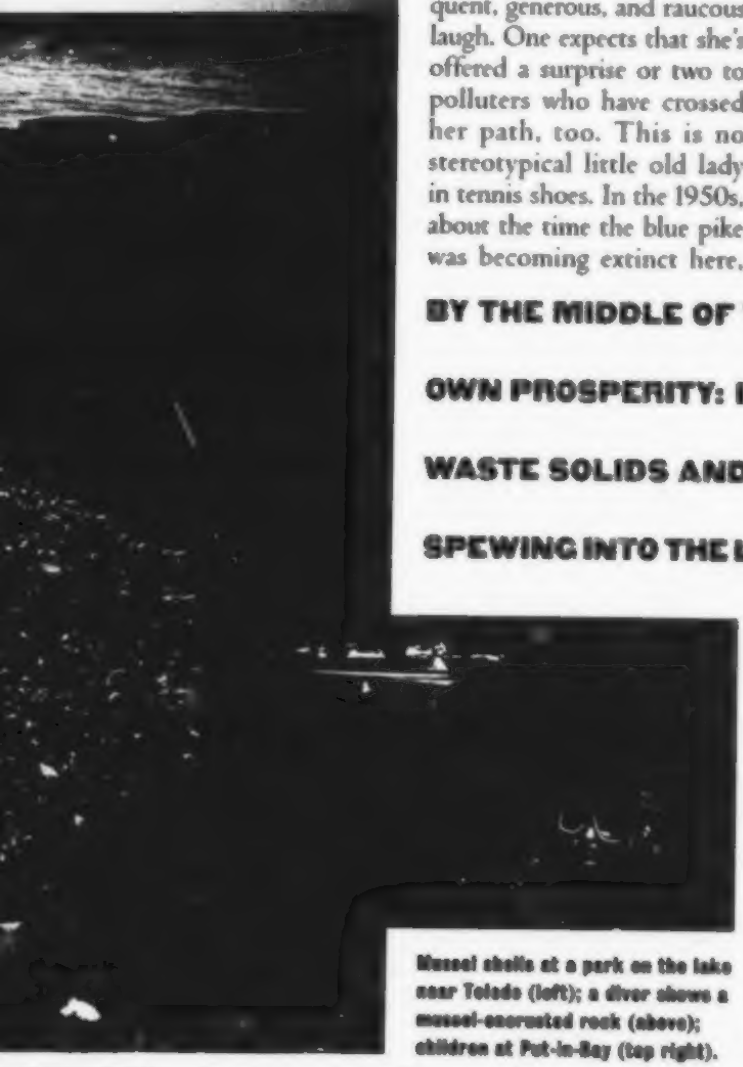
A large species of mayfly called *Hexagenia limbata* that has a disconcerting habit of hatching in great black clouds offered one of the final biological alarms. Its larvae can survive only in relatively clean, oxygen-rich waters. Stanley Wulkowicz, who operates a wildlife museum for tourists on South Bass Island, remembers days before the 1950s when the newly hatched adult insects, drawn to the light, would bury the ground-mounted floodlights at the Perry Monument. "They'd shovel them up," he says. "Sometimes they

had to take a front-end loader to haul them away."

But suddenly the mayflies simply stopped hatching. Biologists were no longer able to find their larvae at the lake's bottom, instead finding only species of worms that can tolerate oxygen-starved waters. In the early 1950s commercial and recreational fisherman were catching 20 million pounds a year of blue pike, a species unique to the lake. By the end of the decade the blue pike was extinct. In the same period of time, the annual catch of the lake's most prized game fish, the walleye, plunged from 15.5 million pounds to less than 3 million. By the early 1970s scientists began to report that half of the sampled waters in the lake's moderately deep central basin were devoid of oxygen during the hot late-summer months. In 1971 ecologist Barry Commoner concluded, "The most blatant example of the environmental crisis in the United States is Lake Erie."

The political will to clean up the lake was forged in the heat of fires lit by the admitted "outrage" of people like Edith Chase. At 71, with jet-black hair salted with silver, wire-rimmed spectacles, and a physique thin nearly to the point of fragility, Chase surprises visitors with a frequent, generous, and raucous laugh. One expects that she's offered a surprise or two to polluters who have crossed her path, too. This is no stereotypical little old lady in tennis shoes. In the 1950s, about the time the blue pike was becoming extinct here,

BY THE MIDDLE OF THIS CENTURY, ERIE WAS CHOKING ON ITS OWN PROSPERITY: IN THE 1960S A QUARTER-MILLION TONS OF WASTE SOLIDS AND 170,000 TONS OF OIL AND GREASE WERE SPEWING INTO THE LAKE FROM THE CUYAHOGA ALONE.



Mussel shells at a park on the lake near Toledo (left); a diver shows a mussel-encrusted rock (above); children at Put-in-Bay (top right).

Chase was working as a chemist for the industrial giant Merck, whose headquarters are in New Jersey. Today Stephen Sedam, the National Audubon Society's Great Lakes regional vice-president, calls her "the grande dame of Lake Erie and Cuyahoga River protection."

Chase herself is modest. "Oh, well, lots and lots of people have worked on this," she says. And that's true enough. But few activists have seen the changes in the lake as directly and continuously and authoritatively as Chase. She says her activism through groups as diverse as the local Friends of the Crooked River (*Cuyahoga* is a melding of Native American names meaning "crooked" or "winding") and the Ohio League of Women Voters grew out of an early reading of Rachel Carson's classic, *Silent Spring*.

Her concern began to focus on the lake in the early 1960s, after a move to Akron, when she took her children to a Lake Erie beach where "the lake smelled pretty bad. I found out about water-quality problems and wouldn't let my kids swim in the lake anymore, although it took another two years before the state of Ohio decided that it had to shut the beaches down." And she says she was so alarmed by the end of the decade that she remembers actually being delighted when the Cuyahoga burst into flames, because it finally focused national attention on the plight of the lake. "That fire was a marvelous thing," she says now. "It was a spark that ignited attention across the country. Imagine that—a river burning!"

Today, standing on a pier in the Cleveland harbor, looking out at the lake, which dazzles in the sun like a sheet of blue crystal, Edith Chase puts more than three decades of activism into perspective: "We all worked hard. The lake is cleaner now. We don't have the constant problems with algae blooms. We no longer have the huge anoxic areas in the lake. It's really much, much better. But we have a big job left, and we need to finish that job."

Lake Erie recovered from its darkest days because scientists concluded that phosphorus, a pollutant that acts as a fertilizer, lay behind the lake's massive blooms of algae and ultimately, the deoxygenation of its waters, since dead algae were consumed by billions of tiny, oxygen-using bacteria. The lake, in fact, was never dead. It was, as John Hageman puts it, "over-alive." Already a component of household and industrial sewage, phosphorus had by midcentury become a common additive in detergents because it boosts cleaning power. However, conventional sewage-treatment plants cannot remove phosphorus—to do so requires expensive, specialized treatment systems that industries and cities were loath to install.

In 1972 the International Joint Commission, a U.S.-Canadian treaty organization that oversees the two nations' boundary waters, prodded both countries to sign the Great Lakes Water Quality Agreement, which called for sharp phosphorus reductions. By the end of the 1980s the rigid controls mandated by that treaty had led to more than $10 billion being spent on wastewater-treatment-system construction in the United States alone and to dramatic reductions in the phosphorus content of detergents sold in the Great Lakes watershed in both nations. Today, direct phosphorus discharges into Lake Erie have decreased by close to 85 percent.

"WE ALL WORKED HARD," SAYS ACTIVIST EDITH CHASE. "THE LAKE IS CLEANER NOW. WE DON'T HAVE THE PROBLEMS WITH ALGAE BLOOMS....IT'S REALLY MUCH, MUCH BETTER. BUT WE HAVE A BIG JOB LEFT, AND WE NEED TO FINISH THAT JOB."

Still, the lakes and their tributaries continue to be beset by pollution from a myriad of places—"nonpoint" runoff from farms and urban and suburban streets. "The government went after the point sources, the industries and municipal sewage-treatment plants, because it was easy to identify them," says Chase. "Now it's our turn. People need to understand that it's the little [Continued on page 96]

A great blue heron finds a haven in the Magee Marsh Wildlife Area—a 2,000-acre wetland complex that includes the Crane Creek Wildlife Research Station.

MAP BY JONATHAN B. FOSTER

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A Walk With A. R. Ammons

An "extravagantly inventive" and widely acclaimed American poet offers his own way of looking at nature.

By Jon Gertner

Brink Road is a steep one-laner that angles east off Route 96 between the hamlets of Catatonk and Candor in upstate New York. It's about 20 miles south of A. R. Ammons's house, on Cayuga Heights Road in Ithaca. Ammons is the Goldwin Smith Professor of Poetry at Cornell University, and *Brink Road* is also the name of his new collection of verse: more than 150 poems, some of which date back to the early 1970s but have never been collected. Certainly the title has significance, I was thinking to myself as I drove here, a metaphor for . . . something. Later, over coffee in his living room, Ammons tells me that he sometimes has brunch with his wife, Phyllis, down by the Susquehanna, and that he's noticed the road sign on the way. "*Catatonk* sounds like *catatonic*," he says with a smile, and the town of Candor—well, you know what candor is. He pauses and shrugs, explains that the road in question comes in between the two. "I think that sounds like a brink to me."

Brink Road includes such observations as this one-liner, titled "The Story":

Oblivion keeps the caterpillar bright.

And among the other poems:

KILLING STUFF OFF

These geese flying over now will be late
geese, the territories north already split

up and claimed: they'll have to fly
farther (north, north) till lichen's

the ground brush and chill never leaves the
nest: I wonder if geese do go that far,

lay eggs in frizzled moss and shrivel through
cold summers: geese mostly squabble over

at about the right time, error kept low by high
mortality among the very early and late: the

extremes are costly as usual, I'm afraid, even if
that's where persistency's invention cuts

most sharply new, necessity permafrost:
but there's no use to worry; things shape

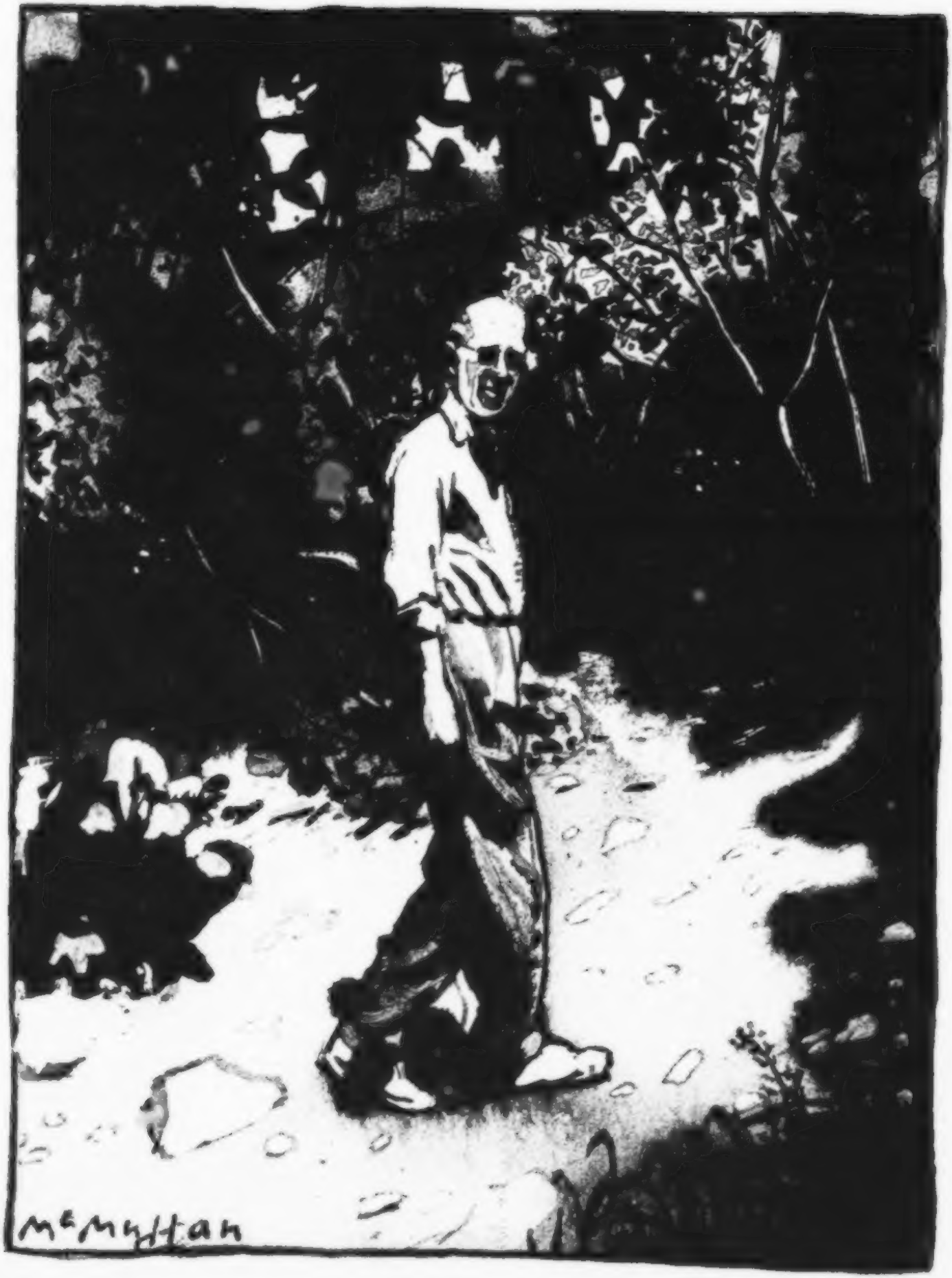
themselves: still, in the short run, when
I hear geese going over this late, my heart
swerves, my throat jumps, late, late.

Brink Road shares a living room shelf with more than 20 other books of poetry that Ammons has written, as well as with two National Book Awards, the National Book Critics Circle Award, the Robert Frost Medal from the Poetry Society of America, and other awards—and with his son's soccer trophies, which he would much rather discuss. Ammons, who turned 70 this year, laughs often and hard, has pale skin and rosy cheeks and hazel eyes and enormous hands, stands just over six feet tall with a hint of a stoop, and retains a fringe of auburn hair around his dome of a head. The measured pacing of his speech and his throaty, musical North Carolina accent give him an air of unhurried tranquility.

The living room shelf also holds one copy of *Ommateum*, his first book of poems. Ammons was working as a vice-president for a biological-glass company in southern New Jersey when, in 1955, a small Philadelphia publisher printed 100 copies of the slim volume (the title came from the word for the compound eye of an insect), with its handful of dramatic, at times darkly mystical poems set against a backdrop of dust and dunes and the humbling, oceanic roar of surf. A commercial failure, *Ommateum* sold a mere 16 copies over the next five years, and nearly a decade passed before the publication of Ammons's next book, *Expressions of Sea Level*. Like those in his first book, the newer poems were lonely, lyrical excursions—many inspired by walks along the beach or in the tidal marshes of the south Jersey coast. The poems' narrator chatted with the wind (which spoke back) or with the mountains; he reckoned the configurations of nature against his own mortal anxieties in sentences suffused with exact biological and geological reportage.

Expressions was a tremendous critical success. And by 1965 A. R. ("Archie" to his friends) Ammons, a stranger to academia and a former science student who hadn't ventured more than a few miles from his family's subsistence farm in North Carolina for the first 17 years of his life, had accepted a teaching position at Cornell. "At first I was the only one in the English department without a Ph.D.," he recalls.

We're discussing this as we ease past the living room bookshelves into a hallway and then turn into his small office. There are no books in here—just two chairs and a desk, a twin bed, a radio, a flourishing philodendron, and an old



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ILLUSTRATIONS BY JAMES McMULLAN

Underwood manual typewriter with a narrow roll of adding-machine tape feeding into it. Ammons has used adding-machine tape to compose his long poems since the early 1960s, and anything that happens during a particular day might rate a mention, especially ideas that accrue during the long walks he takes before sitting down to work. At the end of each writing session he tears off the day's work, edits it, and continues working on the poem until the roll of paper is finished.

"Here, look. See, I wrote about you yesterday," he says mischievously, picking up a long, narrow tear sheet tentatively titled "#7." He begins reading: "The man from *Audubon* is coming," Ammons says, "to profile, defile, or just file me down...."

Even if one were immune to his graciousness and good humor, it would probably be impossible to defile Ammons. He has created a vast body of work and without fanfare won a permanent place in the canon of modern literature. Now is the time when biographers—along with a parade of graduate students dissecting his poetry for their doctoral dissertations—have begun wearing a path to his door. Critic and author Harold Bloom told me, "Archie and John [Ashbery] are what we have left. There are many, many others writing fine poetry, but they are our two greatest poets."

And yet he isn't widely known outside the coterie of serious poetry readers, in part because Ammons isn't easy to classify as a member of a literary movement or ideological salon or stylistic clique. "There's not a particular niche or circle you can assign him to," says Gerald Howard, Ammons's editor at publisher W. W. Norton. Over the years, however, a consensus has emerged about Ammons: that his poems, showcasing an extraordinary personal intimacy with nature, follow closely in the spirit of Emerson, Thoreau, and to some extent Walt Whitman and Emily Dickinson.

"There is this transcendental quality," observes Ammons's friend David Lehman, who is a poet and editor of the *Best American Poetry* anthology series. "But often the expectation is that a poet who writes about nature will be conventional. Archie is also a poet of extravagant invention and imaginative innovation." In Ammons's work, descriptions of natural patterns often move into forthright admissions of personal pain and anxiety. And after a few coffee talks with him it seems that his free-roaming conversations reflect how the eclectic concerns within his writing braid together—the clinician of natural wonder suddenly shifts to matters of profound grief or hits a soft bump of wit, as in his recent book-length work *Garbage*, in which he asks, "is a poem about garbage garbage"? He is, as Helen Vendler, the poetry critic and Harvard University professor, says, "such an ample

CENTER

A bird fills up the
streamside bush
with wasteful song,
capsizes waterfall,
mill run, and
superhighway
to
song's improvident
center
lost in the green
bush green
answering bush:
wind varies:
the noon sun casts
mesh refractions
on the stream's amber
bottom
and nothing at all gets,
nothing gets
sought at all.

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poet that any reader could find his or her Ammons within the whole."

It is hard to imagine that Ammons's childhood was spent digging furrows with a mule on the 50-acre farm where he was born, just outside Whiteville, North Carolina—population 5,500. His family weathered the Great Depression by growing corn, tobacco, tomatoes, strawberries, and a smattering of other crops. The only book in the house was a Bible. Two younger brothers died, one at birth and one at 18 months. Those losses, Ammons has written, still account for the undercurrent of mourning and the "tone of constraint" in his poetry—though he has rarely incorporated specifics about the tragedies into his verse. Fifteen years ago, he recalled his young brother in a short essay that appeared in *The New York Times Book Review*: "I have images of him lying in his cradle covered with a veil, and I saw his coffin being made, and I watched as he was taken away, his coffin astraddle the open rumble seat of a Model A. I see my mother leaning against the porch between the huge blue hydrangeas as she wept and prayed." Several days after the death, his mother discovered his brother's footprint in the yard and tried "to build something over it to keep the wind from blowing it away." In a 1989 interview, he recalled that memory as "the most powerful image I've ever known."

It wasn't until Ammons had finished high school and joined the Navy that he discovered poetry. "When I was in the South Pacific there was an anthology of poems on board ship," he tells me during our conversation at his house in Ithaca. "I began to read it and try to imitate them. It never occurred to me that there was somewhere to publish a poem or to teach. I didn't know there *was* such a thing. I had just come from a farm during the Depression. But I just did it and kept on doing it." After he left the service he earned a B.S. in general science from Wake Forest College, where he met a young Spanish teacher named Phyllis Plumbo. Following graduation, he took a job as principal of a three-teacher school in Cape Hatteras, North Carolina, married Phyllis, and then spent three semesters in Berkeley, California, studying English before returning to New Jersey in 1952 to take a job at his new father-in-law's biological-glass company. He continued to write constantly, but poetry never seemed like a full-time career. "I guess if you're a farmer," Ammons says in retrospect, "art seems pretty far from your major concerns."

Three years later, however, *Ommateum* was published, and by the mid-'60s he had arrived in Ithaca. His landscape had changed considerably, and the adjustment in his poetry, as he explains it, would take time: He'd left the dark, rich soil of North Carolina and the family farm that first forged his closeness with the land and the weather; also left behind were the pine barrens and open sky

THE PLANET THAT WAS THERE

The snowflake knows
nothing, of course,

but for all it
knows, it could,

loosened from the blue
bottom of a cloud, drift

to the planet's
center,

except that willow withes
or tall brush or even

grass or bog-sphagnum
interrupt, and the so-long

journey that started
out

touches down, spending
its way at once,

flicks of momentum lying
about in mounds and lees.

FALL'S END

Glassy rain on the roads
and day melting down:

the bony hedges ink up,
tip-end inscriptions as if

scribbling out of here:
this prison is round,

the soul says, dusk
rounding into dusk:

the horizon's too gray
to part from the hills and,

now, the mist is too
fine to shiver

the puddles: remember
bread
daylight: a redbird pitches

flickers in the shrubs,
a color beyond belief.

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he had loved in New Jersey. He had now come "to tortuous bends in the road, to rocks," as he says with a bit of a scowl, describing the ridges of shale and the switchback county highways of upstate New York. When I ask if he's fallen in love with Ithaca after all these years, he replies that no, no, he has not, but that maybe he never really does fall in love with a place. "I would say I float," he explains. "I'm kind of homeless. I can touch down wherever necessity requires and engage myself sufficiently with the landscape to get by."

"You see, I often try to write about things that are so common that no one pays any attention," he says, with an uncharacteristic urgency in his voice. "But I try to make those things *radiant*."

My sense of it," says Ammons, "is that I go around with a kind of an unfortunate load of anxiety, sometimes at a heightened level and others not. And I see something, and I think this is the way it goes in nature: a ditch or a stone or the bark falling off a stump or a bird washing itself in a brook or something like that. I have many poems about these very things. They seem to condense or concretize or make immediate a situation that corresponds to the feeling I have. I have the sense that I gain some release by finding an external embodiment of something inside. That feels better—one achieves some release from anxiety. Especially, of course, when you get back home from the walk and write

READING

It's nice
after dinner
to walk down to
the beach

and find
the biggest
thing on earth
relatively calm.

WINTER SCENE

There is now not a single
leaf on the cherry tree:

except when the jay
plummets in, lights, and,

in pure clarity, squalls:
then every branch

quivers and
breaks out in blue leaves.

SMALL SONG

The reeds give
way to the

wind and give
the wind away

CROW RIDE

When the crew
lands, the
tip of the sprung spruce

bough weighs
so low, the
system so friction-free,

the bobbing lasts
way past any
interest in the subject.

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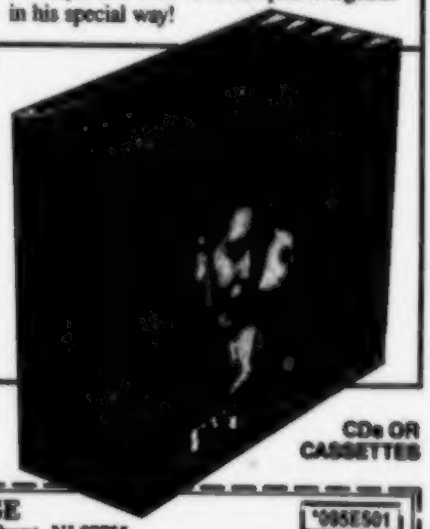

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crops or pond water could be the least bit impure. "It just must be thirty, thirty-five, forty years ago that this began to dawn on me.... And it was a very painful thing to accept."

Has he accepted it? "I have, I have," he replies instantly. "I no longer weep for the earth. I can weep for us—but I now believe there is a freshness of dynamics at the center of what can happen on this planet that will restore the earth. All we have to do is change our ways or disappear, and the earth would be a splendid planet again. See, the earth itself is a record of slow but dramatic change in its temperature and its configuration, and as we do things to the environment it will respond in ways we don't yet know or understand. And perhaps it will respond in a fruitful way as far as the planet goes."

"So let's not worry about the earth," he says after a pause. And then dryly, without the slightest trace of drama, he adds. "Let's worry about what we've done to it, and what we can do to save ourselves."

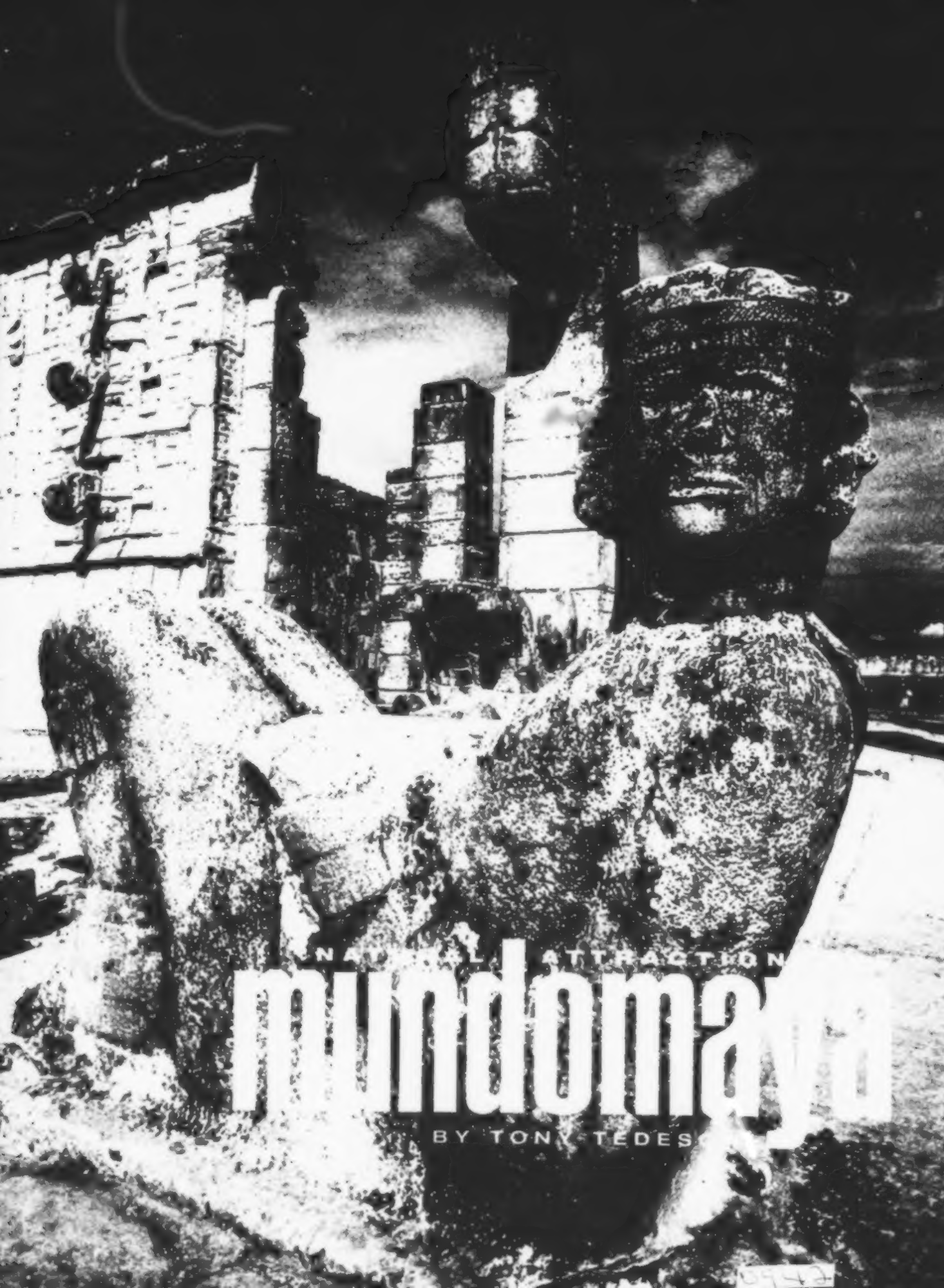
A Guide to Further Reading

A. R. Ammons's Collected Poems 1951-1971 has gone out of print, and he seems averse to the idea of an updated edition: After 45 years of writing, he says, there are simply too many poems to fit into one binding. New readers can choose instead from nearly a dozen other books. In addition to *Brink Road*, Ammons's newest volume of poetry, here are others worth considering, all in paperback:

• *The Selected Poems: Expanded Edition* (W. W. Norton/$9.95) A collection of Ammons's most acclaimed work before 1980.

• *Garbage* (W. W. Norton/$9) Winner of the 1993 National Book Award for Poetry, this audaciously titled book-length poem was inspired by a colossal ziggurat of trash off I-95 in Florida.

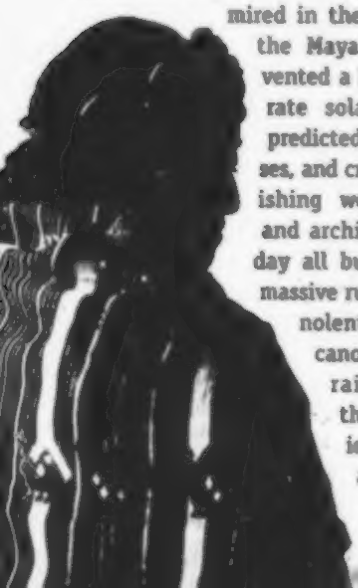
• *The Really Short Poems of A. R. Ammons* (W. W. Norton/$8.95) Witty, wise, and—yes—really short, these poems rarely go longer than 10 lines. Some of the more clipped verses about nature included here resemble haiku; others are crisply aphoristic. —*J.G.*


NATURAL ATTRACTION
mundoma
BY TONY TEDESCO

Previous page: Chac Mool at the Temple of the Warriors, Chichén Itzá, Mexico. Above: Tulum, the only coastal Maya city, lies to the south of Cancún. Below: Descendants of the ancient Maya still inhabit much of Central America.

yucatán

For the traveler with an interest in ancient history, the rise and fall of the Maya empire is a source of endless fascination. Three thousand years ago, as many as 100 city-states flourished across what is now known as the Central American landmass. And while Europe was still mired in the Dark Ages, the Maya people invented a highly accurate solar calendar, predicted lunar eclipses, and created astonishing works of art and architecture. Today all but the most massive ruins lie somnolent beneath a canopy of dense rainforest — their mysteries patiently awaiting rediscovery.



North of the colonial city of Mérida is the Gulf coast and Dzibilchaltún, one of the longest continuously inhabited Maya settlements—from about 1500 B.C. until the time of the Spanish conquest. It was also one of the largest and most heavily populated cities: Archaeologists estimate that more than 8,000 structures once stood on the site. In the center of a broad roadway stands the Temple of the Seven Dolls, its eye-catching hieroglyphics and doll-like figures carefully restored. The temple's square design and windows are unusual in Maya architecture.

The beautifully preserved Castillo, the most significant building at Chichén Itzá, is one of the most easily recognized images of El Mundo Maya. The temple at the summit of the pyramid can be

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Above: The North Acropolis of Tikal, Guatemala—one of thousands of structures found in the park. Below: A feathered serpent head at Chichén Itzá.

reached by 91 steps on each side, making a total of 364, denoting the number of days in a solar year. One intriguing aspect of the stairs is that they widen as they ascend, seeming not to converge at the top and thus utterly confounding the perspective of someone standing at the base. Chichén Itzá includes other ceremonial buildings, commercial structures, dwellings, and the Great Ball Court, where the excitement of sport ended in the drama of human sacrifice.

Sitting literally at the edge of the Caribbean, Tulum was one of the last centers of the Maya civilization, inhabited up until the 1530's. Located just to the south of Cancún and across the water from Cozumel, it is one of the most popular Maya sites. The only coastal Maya city, Tulum is thought to have been exclusive to nobles and wealthy merchants. Bathed in the first light of sunrise, this "City of the Dawn," high above the turquoise waters of the Caribbean, is truly a remarkable sight.

Tikal's giant pyramids pierce the green canopy that covers the country's Petén region like the spearheads of gargantuan warriors. Some 40 miles northeast of the village of Flores, Tikal—the most majestic Maya site of all—sits amid a 200-square-mile national park. This sprawling urban center ruled MesoAmerica through much of the Classic period (A.D. 200–A.D. 900). While Tikal is one of the best-documented Maya cities in existence (it includes some 3,000 buildings) it still harbors secrets as yet uncovered. The pristine rainforest that surrounds the ruins is complete with howler monkeys and hundreds of bird species (including the rare quetzal), and provides yet another incentive to visit.

The true outdoor adventurer can explore a dozen other sites in the area. Uaxactún, with one of the oldest temples excavated, dates from about 2000 B.C. And far north of Flores, near the Mexico border, lies El Mirador, the preeminent political center before Tikal rose to power.

An organization called ProPetén has been formed to preserve the incredible riches of El Petén, as well as to create a thriving local economy. Among its offerings is the Scarlet Macaw Trail, which winds through a world of jaguar, tapir, spider and howler monkeys, more than 50 species of reptiles, and more than 300 species of birds. Journeying on foot, on horseback, and by boat with the guides of Seattle-based Wild Land Adventures, visitors finish their trek on top of the Buena Vista cliffs—nesting site of the scarlet macaw.

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Altun Ha lies to the north of Belize City and a few miles inland. Once home to almost 10,000 people, this city was an important trading and agricultural center. A series of painstakingly excavated pyramids and lesser religious buildings

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are focused around two ceremonial plazas. Jade carvings were a specialty of local artists and craftsmen; a spectacular work is the carved jade sculpture portraying Kinich Ahau, the sun god, which was discovered in the Temple of Masonry Altars. At six inches high and weighing almost ten pounds, it is the largest jade carving found in the Maya world.

In order to reach the famous ruins of Xunantunich, or "Maiden of the Rock," near the Guatemala border, you must cross the Mopan River by way of a hand-pulled cable ferry. Set on a hill above the river, this site is Belize's archaeological pride and joy. Here in the shadow of El Castillo, descendants of the original inhabitants still tend their gardens and wash their clothes in the river. Traditional dwellings and plazas are dwarfed by the 130-foot-high great temple, now known by its Spanish name. A climb up the massive pyramid will reveal some of the best-preserved and most-detailed glyphs found thus far. From the top of the pyramid, the Belizean and Guatemalan countryside unfurls below.

At the western end of Belize's largest protected forest area is Caracol, which is dominated by the Caana, or "Sky Place,"

Top: Altun Ha, Belize; Left: Unearthed treasures—a jade necklace, spearheads, and pottery from the Belizean archives. Right: One of many stelae found among the ruins of Copán, Honduras.

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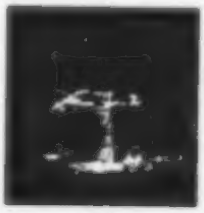

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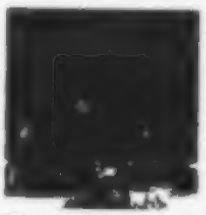

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pyramid, at 139 feet the tallest manmade structure in Belize. Discovered by a wood cutter in 1938, this site was first thought to be a minor one; however, hieroglyphics uncovered and translated indicate that Caracol waged successful campaigns against its neighbors, including Guatemala's mighty Tikal. Elaborate tombs designed for women call into question long-held theories of female subservience in Maya society. There are plans afoot to make Caracol a major archaeological park, although getting there is still somewhat difficult, and a permit from the Department of Archaeology is required to enter this remote area. Intrepid travelers are rewarded at journey's end by the sight of a lost city second only to Tikal in size and scope. A royal tomb unearthed there in 1992 could be the most significant discovery of the decade.

The process of discovery and restoration in Belize continues. Just a few months ago, archaeologists excavated a burial chamber at La Milpa, in northwestern Belize near the Mexico and Guatemala borders. The contents of the tomb offer a wealth of tantalizing relics of royal significance. For example, a jade vulture head pendant, known to be an icon for a Maya ruler was found. Scientific analysis of other objects discovered there dates the chamber to approximately A.D. 400.

elsalvador

Around the town of Chalchuapa, just over the border in El Salvador, is a series of Maya sites, some literally scattered among present-day coffee fields. While Trapiche and Joya de Ceren provide clues to the earlier periods in Maya civilization, Tazumal has also yielded important insights dating back at least 3,000 years. Twenty-seven tombs mark the area as an important burial site, but the primary and most obvious attraction is a large pyramid. Pottery and other artifacts excavated at the site appear to have come from, or to have been influenced by, craftsmen in Guatemala and Honduras, suggesting that Tazumal was also an important trading center.

Top: Maya nobles depicted in murals at Bonampak, Mexico. Center: Ceramic vase, Joya de Ceren, El Salvador. Top right: Subterranean Maya shrine from the pre-Classic period, Belize.

Above: © D. Donne Bryant • Left: © Richard Hunt • Opposite: © Joel Gunn

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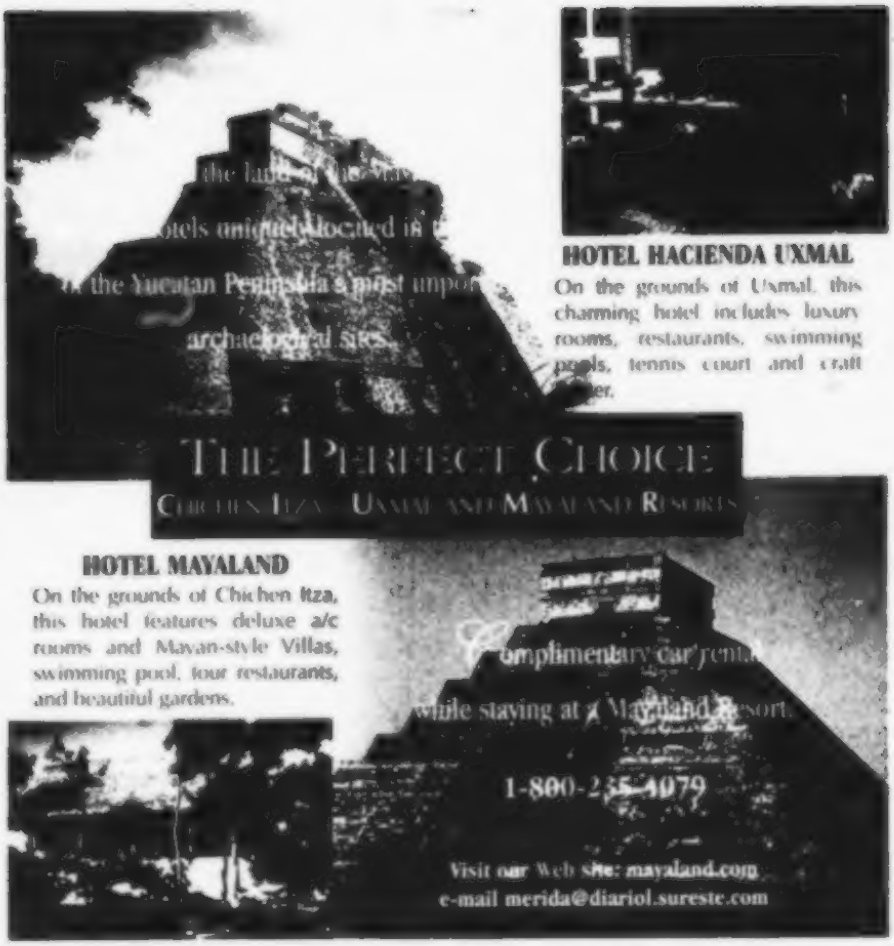
the ruins of Copán add a unique historical and cultural element to the remarkable natural wonders found there. While not as big or as old as sites found in other parts of Central America, this "Athens of the Mayan World" is rich in art and architecture. Well-preserved temples are incised with intricate glyphs detailing kings, conquerors, and divine beings. Stelae and stone carvings are strewn strategically about the complex, and an enormous array of dwellings and tombs reveal details of life among both the nobility and the low-born. Copán, easily accessible by major highway, is a short stroll from a charming village called Ruinas Copán, with lively restaurants and a bustling marketplace. The location of a flourishing modern town here confirms what the Maya discovered centuries earlier: This sunny, dry, breezy mountaintop is a lovely place in which to settle. You can easily spend an entire day wandering around the remarkable ruins where history is still being pieced together. In the coolness of early evening, browsing white-tail deer and green parrots coming home to roost will encourage you to come back another time.

A new museum, scheduled to open this summer, will be one of the most ambitious along the Maya route. It will house a reconstructed pyramid illuminated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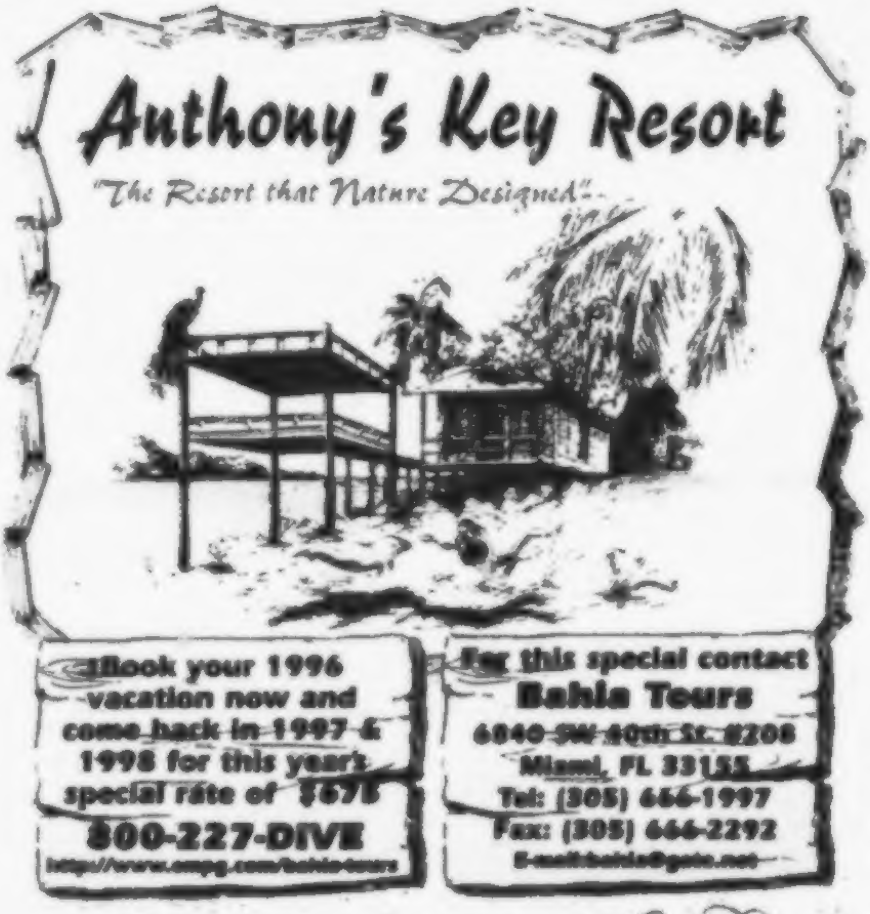
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hawk kill became international news that vexed Argentine agricultural officials. Maria Elena Zaccagnini is the top wildlife biologist with INTA, a scientific research group with strong connections to Argentina's developing agriculture industry, and she has been working closely with North American colleagues on the Swainson's hawk matter. Her latest news, Woodbridge says, is that after weeks of interagency bickering, the federal government has prohibited the use of monocrotophos for pest control on alfalfa and sunflowers, the crops associated with raptor deaths. The problem, as he sees it, is that enforcement of the ban is left to the provincial governments, which are strapped for resources, "and there's a lot of monocrotophos that has been purchased by farmers or is sitting on the shelves." Woodbridge says that INTA will be testing alternative pesticides for grasshopper control, as well as using its extension network to get the message about monocrotophos and hawks to every farmhouse. But he still expects to see hawks dying on the pampas this coming winter.

"Don't blame the farmers," Woodbridge adds. "The problem lies with an international marketing system that supplies them with inappropriate chemicals and doesn't give them the kind of information they need to make the right choices."

Meanwhile, Argentine scientists, with tactical, technical, and financial help from the United States and Canada, will greet this fall's incoming flight of Swainson's hawks—including some 30 satellite-linked birds from every part of their breeding range—with ambitious plans for monitoring the raptors' habitat use, flocking behavior, fidelity to roost sites, and exposure to chemicals. Woodbridge will be there, of course, helping trap hawks that will be rigged with conventional radio transmitters so researchers can follow their local movements. Goldstein will be there to help with the toxicological work.

"I hope the hawk kill will be dramatically reduced," says Woodbridge. "The farmers I've met are truly concerned about the birds. One landowner told me it's a shame they can't just call in an air strike of hawks to deal with the grasshoppers."

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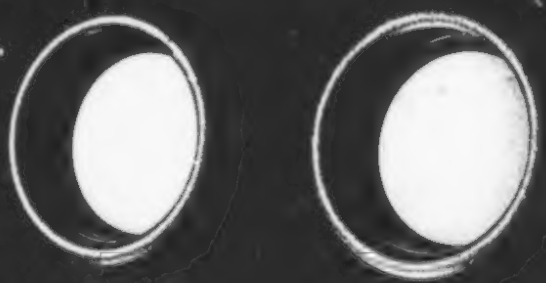

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Activist Edith Chase, who has campaigned for more than 30 years to clean up the lake.

things we do that add up. Problems in Lake Erie now are related to things like my neighbors' dumping fertilizers and pesticides all over their lawns."

A few hours later we stand overlooking the Cuyahoga, 50 miles from its mouth, in the spectacular atrium of a new hotel whose soaring glass facade is cantilevered over the foaming and rushing Cuyahoga Falls. This is the upstream limit of something called the Cuyahoga River Area of Concern, one of 42 pieces of tributary river and bay on the Great Lakes so designated by the International Joint Commission.

The designation means in part that bottom sediments throughout that stretch of river are profoundly contaminated with toxic chemicals, which continue to find their way into the lake, "like steady withdrawals from a savings account," as a scientist once told me. And although cleanup efforts are supposed to be in at least the planning stages at each site, real progress has been hampered in most areas by the daunting cost and complexity of the problem. Where, for instance, to dispose safely of tons of toxic mud from the Cuyahoga's bottom—even if it can be stirred up without releasing even more poison into the river and lake?

"We need to acknowledge that we still have pollution," declares Chase. "But the pollution we have now is invisible. That's a big part of the problem with getting people to care enough about it—to understand that clear doesn't mean clean. Sometimes it makes me wish that all pollution was bright purple, so people could at least see it and know it was there."

The day after my visit to the Perry Monument, the cold nor'easter was still blowing off the lake east of San-

dusky, Ohio. About a mile back from the lake, a bald eagle was cruising low above the tops of a cluster of cottonwoods, its immense white-on-black form nearly motionless on an updraft. Barely visible in the canopy of one tree was a huge jumble of sticks jammed together: the eagle's nest. Beneath the nest, maybe 50 feet from the ground, state wildlife technician Mark Witt swayed perilously in the wind, his torso strapped to the tree's trunk, his climbing spikes jammed into the bark.

As Witt worked his head over the rim of the nest, the six-foot wingspan of a startled, unfledged eaglet suddenly appeared above it in a sharp V, and then the eaglet itself appeared, backing onto the nest's far rim. For a moment it seemed as if the astonished young bird might back off into midair, but Witt gently hooked one leg and coaxed the bird toward him, then plopped it into a nylon bag and ferried it on a rope to the ground. Its young nestmate soon followed.

A team of state wildlife biologists surrounded the young birds like surgeons in an operating theater, extracting blood, measuring wings and weight, and clipping on a leg band, and then prepared to hoist the birds back into their nest. But not before biologist Mark Shieldcastle had done one more critical test. At arm's length, he held each eaglet's bill to the tip of his thumb, squinting for any trace of a cross-bill malformation that might have begun while the bird was still an embryo, exposed to toxic, deforming chemicals in its fat-rich egg.

Bald eagles, once nearly extinct in this region, have returned to the lake's shores. But as adult eagles age—and as they eat more fish from the lake—they accumulate more and more fat-soluble poisons. Some offspring of older eagles tend to exhibit developmental defects, including bills that are so crossed and mangled that the young birds eventually cannot eat.

Shieldcastle was happy to report that he didn't find any deformity in these birds. But the news wasn't so cheery elsewhere. This spring five eaglets had died in their nests along the lakeshore, offspring of parents that fed in the shallow western basin of the lake, where some of the most contaminated

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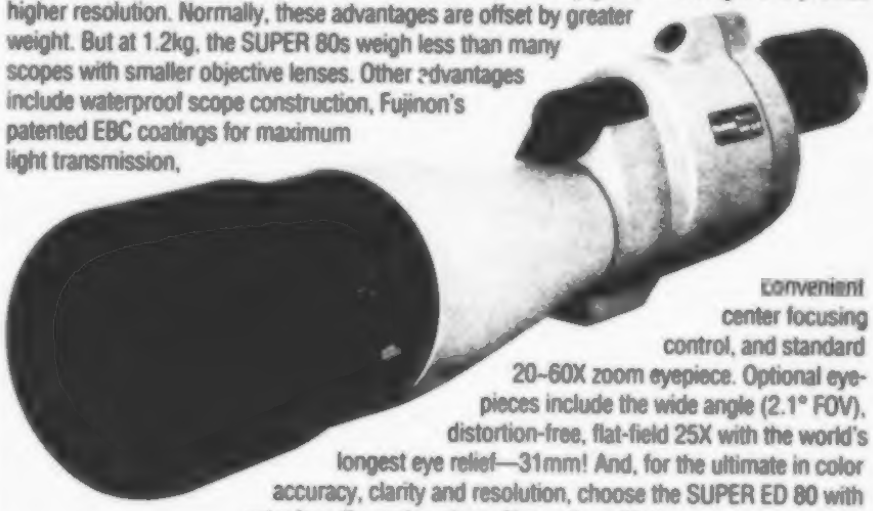

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Researcher John Hageman with a handful of zebra mussels, a prime threat to the lake.

fish swim. Still, that was an improvement over such recent years as 1991, when, says Shieldcastle, "we saw total nest failure," and 1994, which was nearly as bad.

Proving why the eaglets are dying has been difficult, because the dead young are often devoured by either their parents or a scavenger long before researchers can reach the nest. But in 1992 biologists retrieved from a Lake Erie nest two live eaglets with severely crossed bills. The same syndrome has been observed throughout the Great Lakes region among the offspring of other fish-eating bird species with high levels of toxic pollutants in their cell tissues, such as double-crested cormorants. Shieldcastle and his colleagues do know that the worst springs for eaglet survival have followed harsh winters, when adults must rely more on their own fatty tissues for survival. And they know that some eggs that fail to hatch at all carry as much as 50 parts per million of polychlorinated biphenyls (PCBs). "PCB levels associated with disruption of normal reproduction are something like four to six parts per million," says Shieldcastle.

Once widely used by American industry, PCBs continue to persist throughout Erie and the other Great Lakes, even though they were banned in the United States nearly two decades ago. Like other chlorine-based compounds, including the banned pesticide DDT and the dioxins, they have been linked to a host of developmental, immune-system, and behavioral defects in the offspring of wildlife and in experimentally contaminated laboratory animals. These kinds of compounds tend to "biomagnify"—that is, increase in concentration as they move up a food chain into progressively longer-lived animals. As predators at

the top of the food chain, eagles can accumulate concentrations of these compounds that are 2 million times higher than exist in the waters they feed from. Thus the International Joint Commission calls the bald eagle a "bio-indicator" of ecosystem health in the Great Lakes.

The most disquieting news: Shieldcastle says that even though PCBs have long been banned, contamination levels in eagle eggs have begun to *increase*. No one seems to know yet exactly why. But there is a (tiny) suspect.

Not far from the Perry Monument, where we had looked down into clear Lake Erie water, John Hageman walked me out onto a northeast-facing beach to look at what had to be the most remarkable dune in the world. Built by days of winds, perhaps 200 feet long and several feet high, the dune was made of millions upon millions of tiny, brown-striped mollusk shells. I bent and dug down, a foot, then two feet, astonished at the number of shells, each about the size of a dried bean.

That amazing dune represented only an infinitesimal fraction of the uncountable billions of tiny zebra mussels that now thrive in the lake, the multitudinous descendants of mussels that probably found their way into the Great Lakes in 1986, as hitchhikers in the ballast water of an oceangoing ship from Central Europe that had moved, like a floating Pandora's box, through the Saint Lawrence Seaway.

Discharged first into smallish Lake St. Clair, which lies between Huron and Erie, the tiny mussels appeared in Lake Erie in 1989. The warm, nutrient-rich waters proved to be ideal habitat for a species whose female lays a million eggs in a two- to three-year lifetime. "By 1990 we had tens of thousands of zebra mussels per square meter on reefs, islands, anywhere there was a solid surface," says Hageman. "We had calculations of forty to fifty thousand zebra mussels per square meter. One clump at a power plant intake pipe in Monroe, Michigan, had four hundred thousand per square meter." A square meter is about the size of a coffee table.

Zebra mussels virtually glue themselves to any available hard surface, whether it be a rock or a factory intake

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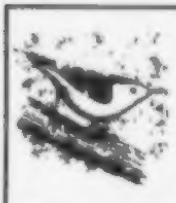
pipe. Within a few years of their arrival, blasting the tough mussels from structures had become a multimillion-dollar surprise expense all along the lakeshore. According to Hageman, the mollusks have also literally wiped out freshwater clams in the lake, not only outcompeting them for the algae that both species filter from the water but literally smothering the clams by gluing themselves en masse to their shells.

A more profound concern is the effect they might be having on the lake's ecosystem overall. "They filter-feed particulates from the lake, which include everything from algae to small zooplankton to mud," says Hageman. The tiny mollusks excrete everything but the algae, he says, but "the real concern is that they are removing the first layer of the food chain." Ultimately, that could mean reduced survival rates for species at each successive food chain level. So far, however, popular game fish like the walleye seem to be holding their own.

But the zebra mussels also are accomplishing another prodigious feat: They are turning the water crystal clear. Each can filter about one quart of lake water per day, filtering not only its own food but other particles as well, which it repackages in a clump called pseudo-feces, heavy enough to settle to the lakebottom. The consequence: With so many particulates being filtered out, large expanses of the lake are becoming even more clear than they might have been with the best pollution control. Scientists have now begun to worry about the effects of such phenomena as intense ultraviolet radiation on fish and other water dwellers that never evolved to cope with it.

Scientists also suspect the tiny mussels of other forms of biological villainy, including injecting into the food chain PCBs and other toxic organochlorines that might otherwise have remained harmlessly bound to sediments. As biologist David Culver of Ohio State University puts it, "With zebra mussels in the lake, something that might have settled safely on the bottom can be turned into nice, quivering, contaminated protoplasm that something—like a freshwater drum or a diving duck—will eat."

Standing with Hageman at Stone



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Laboratory on a dock slashed by waves, I watched as he lowered a black-and-white-patterned disk about the size of a dinner plate into the water to check its clarity. Even in the sandy murk made by the waves, we could see the device, a Secchi disc, more than a yard down. But realizing that pollution isn't purple and that clear doesn't mean clean, I wasn't sure, after all, what to think of the lake's present state.

As the shallowest and warmest of the Great Lakes, Erie has returned to its historical position as the most biologically productive, with one of the most spectacular freshwater fisheries on earth. Boosters like to call the lake the walleye capital of the world. Stanley Wulkowicz, the museum owner on South Bass Island, confirms reports from scientists that the big mayflies have returned. ("You can hear them crunching under your feet at night like popcorn.") Perhaps most hopeful of all, in 1995, after years of intense debate, the states bordering the Great Lakes signed on to the Great Lakes Water Quality Initiative, a plan developed by the U.S. Environmental Protection Agency that calls for rigid controls on further discharges of 22 key toxic compounds.

Still, for all the good news, no one I talked to and nothing I read in a pile of documents suggest that Lake Erie will ever again be quite what it was. The Cuyahoga might not be flammable anymore, and the lake might not stink. But on an elaborate chart it hands out with each fishing license, the state of Ohio warns anglers to limit meals of various fish caught in the lake and its tributaries, and not to eat even a bite of fish from some waters. The new limits on toxic chemical discharges into the watershed are good news indeed. But no one knows how long it will be, if ever, before the contamination of the food chain will finally subside. Zebra mussels, meanwhile, seem to be in the lake to stay.

So what of Lake Erie in another quarter-century? Mark Shieldcastle echoes what other experts have said: "This ecosystem is going through a period of incredibly rapid change, a lot of it because of the zebra mussel. And we just don't know where it's going to end up."

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Green Teens Save the Blues

By Connie M. Isbell

Dedicated youths put in long hours to help an endangered California butterfly.

THE BLUES were flying, and the young volunteers assembled for a Sunday-morning work session on California's Palos Verdes Peninsula were about to be rewarded for their blisters and perspiration. For more than a year they had dedicated precious weekend hours to restoring the last remaining habitat of the endangered Palos Verdes blue butterfly, and they were finally going to catch a glimpse of it.

This unexpected event was not something to take lightly; as one student pointed out, no more than 1,000 people are believed to have ever seen a "PV blue"; fewer than 500 are known to exist, and they have a lifespan of only five days. Carefully picking their way around young native plants, the teens quietly followed Jess Morton, director of Audubon YES!—the Youth Environmental Service program of the Palos Verdes/South Bay Audubon Society—to the flowering, bushy deerweed plants preferred by the small blue butterflies. After a moment or two a blue male fluttered over, alighting for a second before taking off in search of a mate.

The moment was especially sweet, not only because the butterflies are rare or because the species was once thought to be extinct. For on the other side of the fence that encloses the Defense Fuel Support Point, in San Pedro, where the students were working, was a field of decaying compost. A month before, three acres of butterfly habitat—10 percent of the total—was buried under tons of the compost. The dumping occurred when a landscaping company, which was supposed to extend an adjacent parking area, somehow missed its target.

Morton and wildlife officials are concerned about the effects of the compost on the butterflies, and since it is a federal offense to disturb the habitat of an endangered species, the Naval Criminal Investigation Service has taken on the case. "But we're not just talking about one butterfly, we're talking about the whole habitat," says Morton, whose program focuses in part on restoring pockets of peninsula habitat.

ABOUT AUDUBON

Although the Palos Verdes blue butterfly was first named in 1977, its short recorded history has been rocky. By the early 1980s scientists believed the butterfly had been driven to extinction by development on the Palos Verdes Peninsula, which is only about 15 miles south of central Los Angeles. It was not until 1994 that Rudi Mattoni, a biologist at the University of California, Los Angeles, happened upon a PV blue at the fuel-support point. Since then Mattoni, with the support of the site's personnel, has led volunteers in ridding the area of invasive plants and replacing them

A male PV blue displays a more vivid blue than females.

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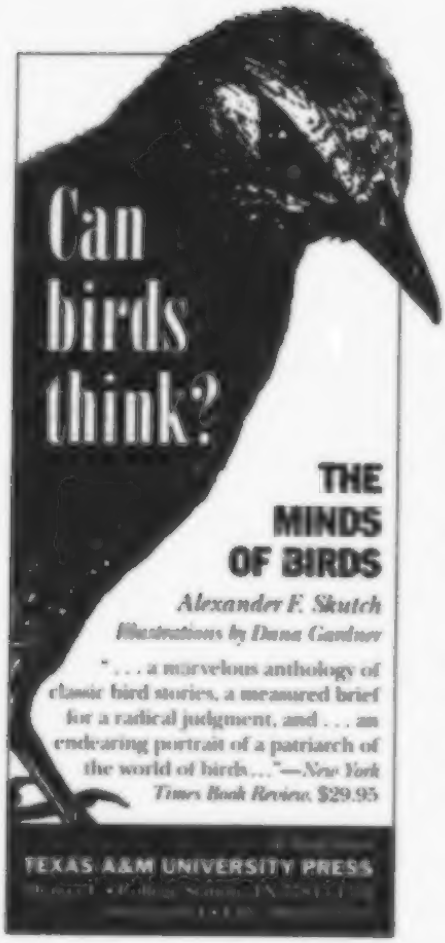
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ABOUT AUDUBON

with the blue's sole food sources, deerweed and rattleweed. And just as the butterfly population seemed to be growing, the compost—which included ground-up trees, lawn clippings from golf courses, and possibly pesticides—was dumped, a move that organizers say could threaten thousands of hours' worth of restoration work.

Many of those hours have been put in by students enrolled in the Audubon YES! program, which is now entering its third year. Two of the volunteers, Hedieh and Hengameh Rahmanou, sisters from Palos Verdes, began as high school seniors and have continued into college, logging an average of 12 hours each month. "You only have to give up a little sleep; saving a butterfly is worth it," Hengameh says as she tears out yet another tangled handful of ice plant—the site's predominant and invasive nonnative.

Morton says his Audubon chapter had always been interested in the area's youth and has elected a high school student to its board each year since 1991. One of the first, senior Holly Gray, came up with the idea of a youth service program. Gray said she wanted to do something for the environment but felt shortchanged by the lack of constructive activities available through her school's ecology club. Today, after a successful two-year pilot, with more than 300 students from 15 area schools enrolled, YES! is poised to take off nationally; two other Audubon chapters have already launched programs in California, and Morton now offers a service to guide interested chapters.

The program extends beyond the well-guarded limits of the fuel depot to sites throughout the peninsula. Morton issues a monthly calendar with at least one workshop each weekend: activities ranging from peninsula-wide beach cleanups to breeding-bird surveys to a program in which older students teach 6- to 12-year-olds about nature. The program is also designed to encourage students to come up with their own ideas, Morton says. After 50 hours of service, students earn an award, and some also receive a one-year Audubon membership.

Melody Schmid, a senior at Chadwick High School, has earned the award and continues to add up hours. On a Saturday morning in April, she joined a group of 30 students at the 50-acre Madrona Marsh, one of the last remaining vernal marshes in Los Angeles County, to yank out nonnative grasses and learn the basics of planting native lupine seedlings. With a job and college to think about, Melody said, she was finding it harder to squeeze in all of her activities. But 12-year-old Michael McNamara, one of the youngest in the program, found time that weekend for both the marsh and the butterfly work sessions.

Audubon's Jess Morton talks with volunteers near composted area (top). Debris and exotic plants are removed to make room for the butterfly's food plants (bottom).

Morton, who keeps a careful eye on the projects and the students, points out that although a YES! program must give some basic structure to students, it should be flexible enough to suit individual needs. Although they all share an interest in activism, the students come from a wide variety of backgrounds, leaving Morton to deal with issues that range from lack of transportation to

SUSAN MIDDLETON

parents fearful of gang violence.

"If you're going to get a program started, you just have to get going and put it out in front of people," says Morton, who has watched the program grow slowly but steadily. As director, he makes the initial contacts with schools, then coordinates a group of chapter representatives—one per school—who visit classes or club meetings and organize student work groups.

At the naval depot that Sunday morning, Francisco Marquez, a senior from Hawthorne High, spotted one last blue in the deerweed near the compost before leaving to do some other work. "We're starting to get a glimpse of what habitat we had here originally," said Jon Earl, director of Rhapsody in Green, another volunteer group at the butterfly site.

The excitement over the appearance of the blues had slightly disrupted that day's work session, and time would tell what the effects of the compost would be. But the restoration will continue: Nestled in a laboratory down the hill, more than 100 PV blue pupae continued their metamorphosis in a closely watched captive-breeding program.

AUDUBON NOTES

Fish Invaders: Friend or Foe?

A silent invasion is threatening the native fish of Florida's Everglades watershed, and scientists aren't sure what can be done about it. The Mayan cichlid, a Central American fish similar to the sunfish, was first spotted in Florida waters in 1983. Recent research reveals that this fish is altering the delicate balance of life in the Everglades.

Jerry Lorenz, a biologist at the National Audubon Society's Tavernier Science Center, in the Florida Keys, began collecting fish samples in the Everglades' mangrove swamps in 1989. He noticed cichlid numbers increasing; in the past six years his population samples have gone from next to nothing to as much as 90 percent cichlids, and the fish's range has now expanded west from Miami to

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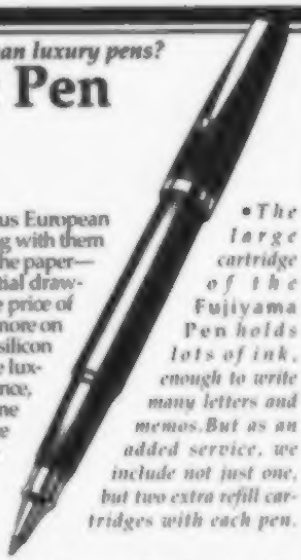

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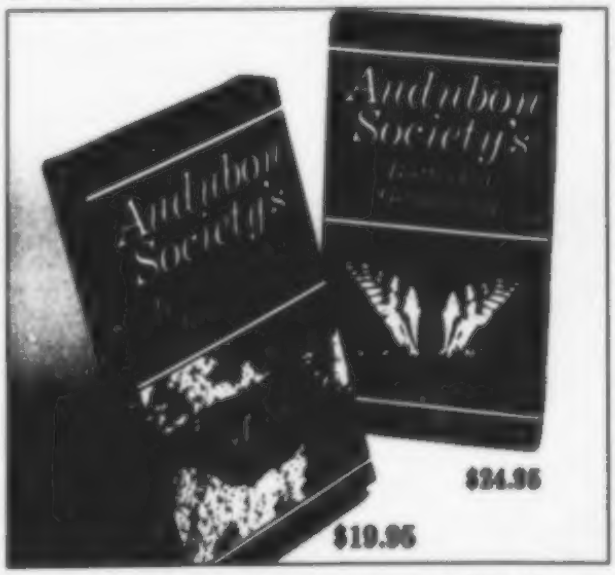

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ABOUT AUDUBON

Fort Myers, on the Gulf Coast.

How the fish originally got to Florida is a mystery. Although many types of cichlids are kept as pets and are sometimes dumped in the state's canals and waterways, Lorenz thinks it is possible that the Mayan cichlid made it to Florida on its own. Because the fish is salt tolerant, a current coming up from the Yucatan coast (the cichlid's home waters) could have carried the fish into Florida Bay.

Now that the cichlids are here, Lorenz is leading an investigation to determine their effect on native fish and the mangrove ecosystem. In 1996 the U.S. Army Corps of Engineers, which was given the task of restoring natural water flows to the Everglades system, announced it would fund Lorenz's project for another year (and perhaps two) in order to determine what effect the corps's work would have on the park's ecology and to learn more about the cichlid.

"We assume the cichlids are having an effect on the wildlife, but what exactly it is we don't know," says Chris Harrington, a biologist at Tavernier. Researchers speculate that the cichlid's aggression poses the greatest threat to native fish. The Mayan invader—growing as long as 10 inches—eats native fish and may also force them out of the shelter of mangroves into the open water, where they become food for birds and bigger fish.

According to John Ogden of the South Florida Water Management District, however, cichlids provide food for the endangered wood stork, which prefers large fish. "In the old days wood storks had more fish to choose from, but more recently the big fish haven't survived the dry periods. These cichlids may be able to tolerate stressful conditions, and they seem to be the right size for the storks." Lorenz, however, worries that cichlids may be harder for the storks and other wildlife to catch than native fish, which could mean less food for offspring and less successful populations.

Like it or not, the Mayan cichlid seems to be here to stay. Recent cold winters in South Florida have killed off large numbers of them, but as soon as the waters warm up, the fish bounces back. On a brighter note: Its sensitivity to cold may be the only factor that keeps the cichlid from moving into more northern climes.

"This cichlid has had a profound effect on native fish populations," says Audubon's Lorenz. "But because I don't have data from before 1989, I have no idea what native fish have been removed. We cannot gauge Florida Bay restoration without understanding what this fish has done to the ecosystem."

—*Mary Sidney Kelly*

A Crow's Last Stand

The endangered Hawaiian crow—the 'alalā—has been given a reprieve thanks to a lawsuit brought by the Hawaii Audubon Society and the National Audubon Society. The lawsuit, settled on May 29, prevented a private landowner from logging the native forest in which the crows nest.

The beleaguered 'alalā has suffered huge losses in recent decades from disease, predation, logging, and development on the island of Hawaii; although common in the early 1900s, only 14 of the birds are estimated to be left in the wild. Logging in the forest, which is also home to three other endangered birds, would have violated the federal Endangered Species Act.

The U.S. Fish and Wildlife Service had intended to purchase the 5,300 acres of 'alalā habitat on the western slope of Mauna Loa from the landowner, but due to the federal budget impasse last spring, the funding was blocked. In the meantime, the landowner drew up plans to log the valuable forest.

With this legal victory, however, the landowner must complete a conservation plan that complies with the Endangered Species Act before attempting any logging. In addition, the Fish and Wildlife Service now has more time to purchase the land—and the 'alalā has gained another breeding season. —*Mary Sidney Kelly*

Update: Murre Lure Works

When National Audubon Society biologist Stephen W. Kress and his restoration team set out their decoys and recording devices to try to lure common murres back to their abandoned nesting grounds atop California's Devil's Slide Rock (see "How to Lure More Murres," About Audubon, May-June), they thought success might lie several years down the road—perhaps 10. But the birds began landing and courting there only days after the decoys went up, in January. On May 25 the team spotted a couple of pairs incubating eggs.

"Eventually six or seven pairs each laid an egg," reports team member Elizabeth McLaren. "Two or three eggs disappeared. One rolled out of the nest and over to a cormorant's nest nearby. The murre tried to roll it back, but the corm wouldn't let her."

But on June 20 one of the eggs hatched, the first murre known to be produced on the rock in almost a decade; it was later followed by two more.

Audubon on TV

In September the National Audubon Society is launching its first season of *Audubon's Animal Adventures*, a new family wildlife series. Each half-hour program will focus on a different imperiled species—from wolves to puffins to bats—and examine its natural history and biology. The programs will air weekly on the Disney Channel beginning Sunday, September 8, at 6:30 P.M. EST.

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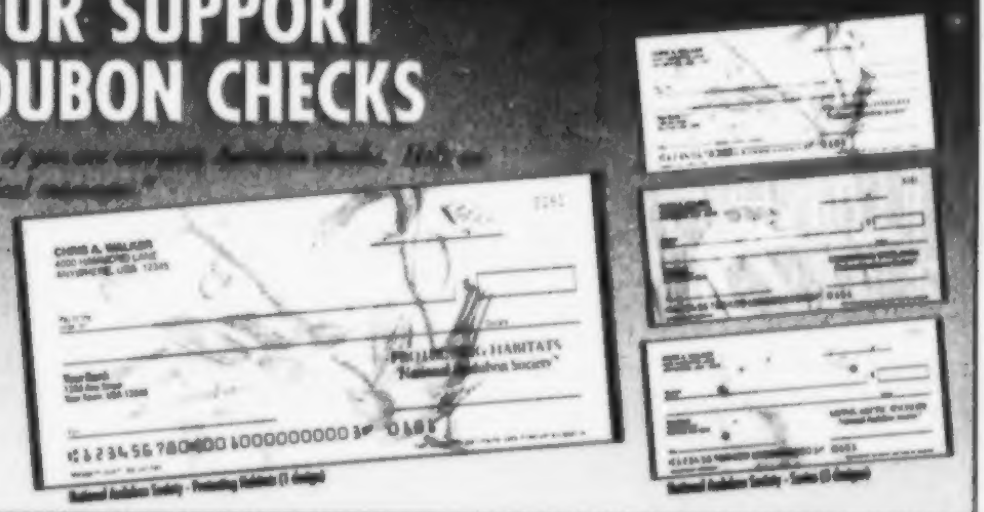

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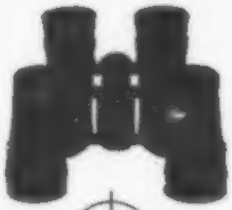

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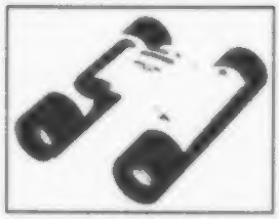

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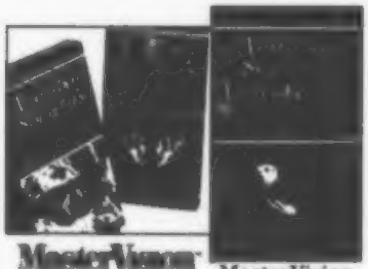

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REVIEWS

GEOFFREY C. WARD'S *THE WEST: AN ILLUSTRATED HISTORY*; STEPHEN JAY GOULD'S *FULL HOUSE: THE SPREAD OF EXCELLENCE FROM PLATO TO DARWIN*; WADE DAVIS'S *ONE RIVER: EXPLORATIONS AND DISCOVERIES IN THE AMAZON RAIN FOREST*

HOW THE WEST WAS TAMED

The story of America's national drama

The American West exerts a powerful pull on the imagination. Its vast stretches of grassland, mountain, rockland, and desert provide a suitably grandiose backdrop for our mythic national drama. In ***The West: An Illustrated History*** (Little, Brown; $60), the companion volume to this fall's public-television series, Geoffrey C. Ward and a team of writers and producers—including Ken Burns and Stephen G. Ives, who worked on the award-winning documentary *The Civil War*—have produced a riveting portrait of a place and its people over the past five centuries.

This is a monumental job of storytelling. Following the pattern set by *The Civil War*, the tale is told through letters and diaries, period photography, and news accounts. There are reports from both the famous and the unknown.

Joseph LaFayette Meek was one of the latter, a runaway from Virginia who in the early 19th century explored the western mountains. His description of the Yellowstone plateau was so dramatic as to provoke disbelief back East. "The whole country," he wrote, "was smoking with the vapor from boiling springs, and burning with gasses . . . like that place the old Methodist preacher used to threaten me with."

Meek's account of his travels reads like *The Perils of Pauline*: attacks by grizzlies, Indian raids, terrible weather, and near starvation. "I have held my hands in an anthill until they were covered with ants, then greedily licked them off," he said. "I have taken the soles of my moccasins, crisped them in the fire, and eaten them."

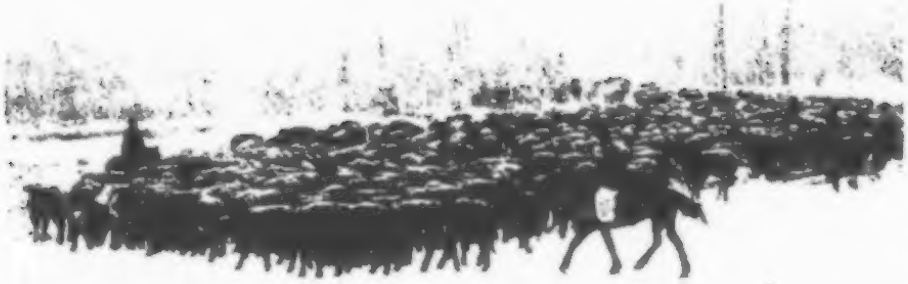
True West: The Hilton family (above) pose outdoors with their pump organ. Opposite, clockwise from top left: A winter roundup; Custer's Crow scouts among his soldiers' gravestones, years after the battle; early tourists at Yosemite; a Blackfoot winter camp in Montana.

Such heroic-sounding adventures camouflaged what was surely a hard, lonely, and often bitter existence. But what of those whom Meek and his ilk displaced in their headlong rush to create a country? The Native American tragedy is laid out here, from the early years of conscription at Spanish missions, where they were put to work growing crops and made to worship the white man's God, through to the final roundups that saw them hidden away on reservations, freeing the land for future railroads and ranches, cities and suburbs. During the gold rush, one Indian agent reported the plight of the tribes: "It is now impossible for them to make a living by hunting or fishing, for nearly all the game has been driven from the mining region. . . . The rivers . . . formerly were clear as crystal and abounded with the finest salmon. . . . But the miners have turned the streams from their beds and conveyed the water to the dry diggings, and after being used . . . it is so thick with mud that it will scarcely run."

The whole sordid history of broken treaties, forced migration, and massacre was summed up by New Jersey Senator Theodore Frelinghuysen. "[The Indians] listened to our professions of friendship. We called them brothers and they believed us," he wrote. "They yielded millions of acres to our demands and yet we crave more. We have crowded the tribes upon a few miserable acres of our southern frontier: It is all that is left to them of their once-boundless forests; and still, like the horse-leech, our insatiated cupidity cries: Give! Give! Give!"

As Ward shows, the strains that continue to plague the West were there almost from the beginning. In what would become Texas, immigration was a problem, but the migrants were going the other way: Although the Mexican government forbade American settlement completely in the early 1830s, 1,000 people a month continued to stream across what was then the Mexican border, despite the contempt in which they were held. "Among these foreigners are fugitives from justice, honest laborers, vagabonds, and criminals," wrote one official, foreshadowing U.S. complaints about illegal *Mexican* immigrants generations later.

Even before the Civil War, Americans had begun a love affair with the Pacific Northwest. Sounding like recent newspaper and magazine stories extolling the virtues of Oregon and Washington, *The*



REVIEWS

Cleveland Plain Dealer claimed in 1843, "There is enchantment in the word [*Oregon*]. It signifies a land of pure delight in the woody solitudes of the West." Likewise, the Los Angeles promoter who in the late 1880s exulted "Hell, we're giving away the land. We're selling the climate" was not so very different from the real estate boosters who carved up the San Fernando Valley almost a century later.

This book encompasses the whole great drama of the West, chronicling the rise and fall of the Californios as well as the westward trek of the Mormons. It follows the sodbusters to the Dakotas and the gold rushers to California. If some of the material is familiar, more is fresh and surprising: comments from the Native Americans who were displaced; remarks from the immigrant Chinese—as well as the Irish, Germans, and Italians who surged in from Europe; letters home from a husband out to make a fortune or a daughter trying to make a life for her family on the frontier; letters from mothers sobered by the death of children, and from orphans whose parents never made it to their destination.

In its later chapters, the book points up the paradox of our western development. It explores the notions of preservation and traces the development of the conservation ethic. It shows the pressures on the land and on the people who tried—and continue to try—to wrest a living from it. Showing the wonder of the West, it also poses John Quincy Adams's unanswered question: "Shall the field and valley, which a beneficent God has formed to teem with the life of innumerable multitudes, be condemned to everlasting barrenness?" —*Linda Perney*

IT'S JUST THAT SIMPLE

Stephen Jay Gould explains evolution.

How is the demise of the .400 batting average in major league baseball like the expulsion of humans from the pinnacle of the evolutionary pyramid? That is a question only Stephen Jay Gould could conceive of—much less try to answer. He does both in his latest book, ***Full House: The Spread of Excellence from Plato to Darwin*** (Harmony Books, $25). And although that particular question may seem too arcane for most readers, it isn't. Trust me.

For many of Gould's loyal followers, *Full House* may be a bit of a departure. But its overriding theme will seem very familiar. Once again, Gould ponders the elegance and simplicity of Darwin's basic theory of selection and scolds those miscreants who persist in misinterpreting it.

There is little doubt that one of the most potent explanations for why the world is the way it is was formulated by Charles Darwin in his theory of natural selection. It is beautiful in its simplicity and unassailable in its power to explain, yet it has also been consistently misunderstood and misrepresented. Perhaps the most troubling and complicated of the misunderstandings—or misrepresentations, depending on your politics—is the notion that selection necessarily moves life in a progressive direction. That is, evolution moves inexorably toward greater complexity, and greater complexity is "better."

Putting aside for the moment the problems of definition when using such terms as *complexity* and *progress* to describe natural systems, there is little doubt that in speaking of the effects of selection as evolutionary, Darwin allowed the public to draw the implication that the changes his theory predicted flowed from a lower level of development to a higher one, both within species and in the process of speciation. By viewing Darwin's theory in this way, humans can comfortably—and scientifically—justify their godlike perch at the top of some evolutionary scale, lord of all they survey.

Stephen Jay Gould has spent his career debunking this particular misrepresentation of Darwin's ideas, and his new book is perhaps the most thorough and direct attempt at a proof that evolution is not progressive, that the three tenets driving natural selection are very straightforward and without bias: 1) All organisms tend to produce more offspring than can possibly survive; 2) Offspring vary among themselves and are not carbon copies of an immutable type; and 3) At least some of this variation is passed down by inheritance to future generations. The offspring that survive and reproduce will tend to be those best suited to changing local environments, not to some larger scheme of "increasing complexity." That's it, and Gould has repeated it over the years like a mantra. But he goes further this time and suggests that selection has not on the whole led to greater complexity at all. It may, in fact, lead to less complexity. Proving this is a tall order, but if anyone can do it, and make the reader chuckle along the way, it's Gould.

The argument in *Full House* takes two steps. First, Gould uses the demise of the .400 batting average to demonstrate the ease with which statistical models that purportedly define systems or populations can be misread, especially if the descriptives used have moral connotations. Does the demise of .400 batting indicate that hitting in baseball has gotten worse over the past 100 years? Or, as Gould argues, does it indicate that the overall quality of play has gotten better? How is it that numbers, on which we rely as pure reflections of objective reality, can be misread so completely? It's easy. Or so it seems when Gould explains it.

Now that we understand the difficulties of relying on statistical models to describe our realities, Gould unfolds his second point. Darwin's theories do not—and Darwin never truly intended that they should—describe evolution as progressive. Gould's purpose is to debunk the notion of directional evolution by debunking the entire idea that complexity is the superior or ultimate form life takes on the planet. In doing so, he shows that very complex life-forms are essentially a kind of artifact of physical and mechanical limitations—statistical distortions, if you will.

Neither declining batting averages nor the appearance that evolution is moving in the direction of complexity is about progress or the lack of it; both are about diversity. We are too often distracted by the averages or the extremes, taking them as definitive when what we should be examining is the "full house" of diversity. In our search for a Platonic ideal in the thrust of evolution, we've missed this essential point of life.

Viewed from this perspective, human beings are not only toppled from the top of the evolutionary pyramid, they become a puny remnant of a puny, short-lived lineage. And they are replaced by

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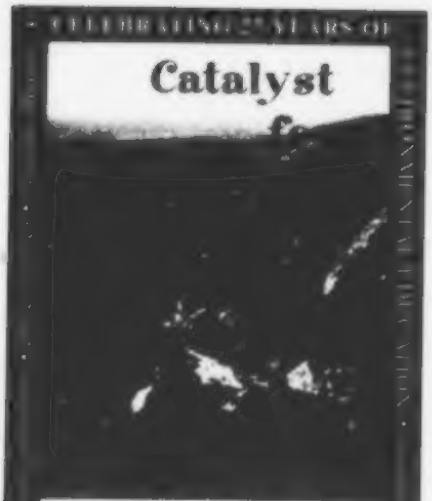

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REVIEWS

the lowliest of the low: bacteria.

The upshot of Gould's argument is that bacteria were, are, and ever shall be the principal form of life on earth. If there is life on other planets, it too is likely to be bacterial. And if evolution follows any trend, it is toward less complexity, not more, although the route is probably random and appears directional only because of statistical limitations. We are, and always have been, living in the Age of Bacteria.

For anyone interested in how the world got to be the way it is, Stephen Jay Gould's books are remarkable. Not so much because Gould illuminates a new universe with each foray into mainstream publishing. In fact, he has now covered much of the same ground from many different points of the compass. Not so much because he is one of the few genuinely accomplished stylists writing about science for a general audience—although he is surely that. And not because he makes the scientific world understandable to the ordinary dolts among us. He does that, too. What makes Stephen Jay Gould a national treasure is his uncanny talent for making each of us share his unabashed enthusiasm for scientific inquiry. With *Full House*, he's done it again. —*Nancy F. Smith*

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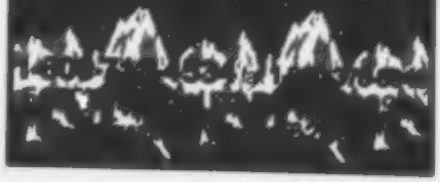

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died of a stroke, at age 77, and now we realize that we know very little about either of their amazing lives.

Part of what we do know comes from another major figure, Richard Evans Schultes, who knew them both. Thanks to Wade Davis, whose new book ***One River: Explorations and Discoveries in the Amazon Rain Forest*** (Simon & Schuster, $27) chronicles Schultes's experiences, his adventures will continue to instruct and inspire us long after he is gone.

Often referred to as the father of ethnobotany, Schultes is also the world's authority on hallucinogenic plants, a great botanical explorer of the American tropics, a productive taxonomist, an expert on the flora and indigenous peoples of northwestern Amazonia, and finally, a great teacher. During his 20-odd years in the field, he figured prominently in many of the great botanical quests of the 20th century, discovering sources of wild rubber and the identities of curare. He also collected more than 20,000 botanical specimens, discovered and/or published numerous plants new to science, authored several hundred scientific publications, and trained and encouraged numerous younger botanists.

In *One River*, Davis has forged a rare combination of exploration and unobtrusive scholarship. His principal vehicle is a 16-month field trip in the 1980s, which took him and one of Schultes's protégés, Timothy Plowman, to some of the key places in Schultes's career. In the book, each place serves as a tether for the history of a tribe, a significant plant, or a phase of Schultes's life.

When Schultes entered Harvard University in 1933, he took a course with botanist Oakes Ames called Plants and Human Affairs—a course offered every year for a century before the molecular jocks edged it out of the curriculum in the 1980s. When Schultes developed an interest in the peyote cult, Ames sent him to Oklahoma with an anthropologist to study its use. His next projects took him to Mexico, where in the almost uncharted territory of central Oaxaca he helped identify ololiuqui and teonanacatl, sacred hallucinogens of the pre-Columbian peoples of the region. He arrived in South America to stay when he obtained a grant to investigate the botanical constituents of arrow poisons.

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REVIEWS

World War II, Schultes was asked to serve his country in an unusual way: Find rubber. The Japanese had captured the Asian plantations that then produced most of the world's natural rubber, and the Allies were in trouble because, as the head of the hevea-rubber project put it, "Everything in this war depends on it."

Hevea rubber comes from several species of trees native to Amazonia, but Asian plantations begun around the turn of the century eclipsed and then almost extinguished the production of the wild-collected rubber that had made Amazonia rich for several decades.

Poorly planned and executed plantations in the Americas had failed, so the U.S. government needed to try to re-create the rubber boom and then collect the germplasm and lay the groundwork for successful plantations in this hemisphere. As Davis points out, the problem was ignorance: "Though hevea was the basis of one of the world's most important industries, with global sales of crude rubber alone generating more than a billion dollars in 1940, no botanist knew even how many species were in the genus."

Davis's acute sense of history of place and his clear descriptions of environments combine to make for effective storytelling. For example, in 1947 Schultes teamed up with Murça Pires on a disastrous expedition on the upper Rio Negro, in Brazil: Funds didn't arrive; rendezvous were missed; food and equipment were stolen; Schultes suffered from fevers; a fire destroyed botanical equipment; specimens rotted because of doctored preserving fluids. After Murça Pires returned to Belém, Schultes came down with such a bad case of beriberi that the group made a risky trip upstream and overland. They shouldn't have made it, but they did.

Davis draws a striking portrait of the man as well as his adventures. Schultes was a quiet fanatic, recording the effects of a powerful hallucinogen as coolly as he wrote up the Latin diagnosis of a new species. As Davis observes, when Schultes became ill he had no patience for convalescence. "Every moment not in the forest was a lost dream, a species denied to science, a botanical mystery left unsolved. To understand his frustration—

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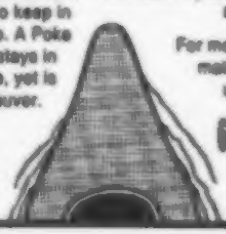

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indeed, the source of his drive and ambition—one must appreciate just what kind of botanist he had become."

Schultes finally came home in 1953, as a professor at Harvard. He taught Oakes Ames's old course, and every year he touched the core of the students just as consistently as he hit the bull's-eye of a classroom target with a dart from a six-foot blowgun at the end of his lecture on arrow poisons. Today he is putting the finishing touches on his last big book, about rubber, but he doesn't tower the way he did, and he's a little forgetful, and after a lifetime of expending parts of his health all over Amazonia, he's not so well. That's why we need Davis's book, to escort us through his amazing life. We need it for other reasons as well: the clear writing, the attention to detail, and the way it serves the history and meaning not only of its heroes but also of its remarkable plants, places, and peoples.

It is impossible to write such an ambitious book without minor flaws. There are a few too many tangential stories, and sometimes there is too much drama packed into the end of each section or chapter. Some of the sources for Davis's description of the rubber boom are purple-prose accounts of questionable accuracy. But these small flaws add up to very little. Davis has carefully researched the history of each place and each key plant, especially the abuses and tragedies of the post-Columbian period: the betrayals and cruelties of the Spanish conquerors; the damaging accounts of "explorers" who hated the forest and portrayed its people as savages; the absurd wealth and ruthlessness of the rubber barons; the U.S.-backed attacks on organized labor; the environmental and cultural destruction wrought by the oil companies.

What Schultes symbolizes is confident scholarship and true adventure: Whenever his research pointed to an intriguing scientific clue in a remote location, he just went, crisscrossing South America and making his discoveries. His mission reminds me of Davis's explanation of the movements of the migratory Kogi: "...in passing over the earth they wove a sacred cloak over the Great Mother, each journey like a thread, each seasonal migration becoming a prayer for the well-being of the people and the entire earth. The Kogi themselves refer to their wanderings as weavings."

—*Douglas Daly*

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ONE PICTURE

By Daniel J. Cox

DOWN FOR THE COUNT
The town of Churchill, on Canada's Hudson Bay, is the self-proclaimed polar bear capital of the world, near the spot where hundreds of the animals gather in late fall before heading out onto the frozen bay to hunt. Onshore, the bears spar and play among themselves; after a match, one of them rolls over on its back, legs straight in the air—R&R.

DANIEL J. COX/NATURE IMAGES

09 28

Field Guide for America

By Frank Graham Jr.

Roger Tory Peterson taught this country to see its birds—and much more.

ROGER TORY PETERSON, who died at the age of 87 on July 28, exerted an enormous influence on natural history and conservation. Rachel Carson's *Silent Spring* may have jolted Americans into the Age of Ecology in the 1960s, but they had been prepared for the transition by a succession of Peterson field guides over the previous three decades. These guides, to everything from birds to seashells, satisfied the human urge to give names to the things around us—in this case, to a whole world of beautiful wild things whose existence many people were beginning to appreciate just as it all seemed to be fading away. By the time Carson revealed the extent of the threats to wildlife, millions had already been primed by Peterson to defend the natural heritage that he had helped them know and cherish.

And now his friends' memories of him waver between the big picture, which projected Peterson as a "personage," and the individual traits that made him a sympathetic human being. I remember him best as a National Audubon Society colleague. He used to say that because of his membership in a Junior Audubon Club when he was 10 years old, he had had "a longer *active* involvement with the society and its affairs than anyone now living." In 1935 he became the society's education director and art director of this magazine, remaining on staff until World War II. He served all recent Audubon presidents as a special consultant, always getting his back up if he felt the society was neglecting natural history education or his beloved birds. "Let's hope the flak at National Audubon resolves itself," he wrote me during a debate over policy in 1991, "and that wildlife will continue to have priority."

Extremely competitive with fellow birders as a young man, Peterson carried that sense of rivalry over into the production of his field guides. He chafed when the sales of others challenged his preeminence, pointing out that rival guides were mostly in paperback, while people paid higher prices for his sturdily bound volumes. Competition drove him to do better. In fact, he did not share an author's usual fondness for his first success, his 1934 book on eastern bird species, *A Field Guide to the Birds*. "I shudder every time I look at it," he told me in 1966. "The drawings are horrible. I revised it completely in 1939 and spent a full year revising it again after the war, but I am still not satisfied."

Other projects and his worldwide pursuit of birds delayed until 1980 what Peterson considered his "monument"—a completely revised eastern guide. But he was devastated when critics vigorously attacked it. Their consensus was that Peterson had spent so much time chasing birds in faraway places that he no longer had a feel for those in his own backyard.

"I had become so depressed by the flak I received from some of the hotshots," he wrote to me later. "Actually the book is three hundred percent better than the previous edition and, even though the text may seem abbreviated, by using economy of words I have given more field marks, not fewer.... The curious thing is that a few of the old-timers have been so conditioned by the previous edition that they resented the changes.... I am determined not to subject *myself* to this sort of thing in the update of the western book and am actively seeking the cooperation of a number of the best birders along the west coast."

P.S.

When his *A Field Guide to Western Birds* appeared in 1990, the barbs turned to plaudits. But later that summer, after he survived a boating accident off the Maine coast, the old criticism still rankled. "Perhaps if I had gotten a really bad review of the new guide," he wrote me that September, "I might have thought 'to Hell with it,' and taken a couple more gulps of sea water."

Roger Tory Peterson was competitive—and an achiever—to the end. Ultimately, his greatest achievement was to change forever the way America saw the natural world.

MARK PETERSON/SABA

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